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ABSTRACT

At the request of the Subcommittee on Elementary, Secondary and Vocational Education of the House Committee on Education and Labor, a multistate study was conducted to examine the effects of reform on performance, dropout rates, and enrollment patterns. The study examined student data from four large school districts in four states where comprehensive state-level reforms have been in effect long enough for a class of students to experience at least three years of high school under the new requirements. The four districts provided computerized records for a total of about 61,000 students. With regard to the performance of educationally disadvantaged students, findings indicated that education reform was neither a disaster nor a boon in the four districts examined. Disadvantaged students appeared to have improved performance in three of the eight cases. The effects of reform on dropout rates were mixed. Only two districts had sound data to identify dropouts. Increased enrollment in academic courses after reform was associated with a decline in vocational enrollment for disadvantaged students. The appendices include: (1) design and measurement issues; (2) median achievement scores and net gain; (3) the effects of reform in rural school districts; (4) related multistate studies; and (5) a list of major contributors to the report. (SI)

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United States General Accounting Office

GAO

Report to Congressional Requesters

September 1989

EDUCATION REFORM

Initial Effects in Four School Districts

EA 021 382

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GAO

United States
General Accounting Office
Washington, D.C. 20548

Program Evaluation and
Methodology Division

B-234358

September 26, 1989

The Honorable Augustus F. Hawkins
Chairman, Subcommittee on Elementary,
Secondary, and Vocational Education
Committee on Education and Labor
House of Representatives

The Honorable William F. Goodling
Ranking Minority Member, Subcommittee
on Elementary, Secondary, and Vocational Education
Committee on Education and Labor
House of Representatives

In the 1980's, states and local school districts have adopted a variety of education reforms intended to raise the quality of public education. At your request, we examined the effects of these reforms on the academic achievement, dropout rates, and enrollment patterns of educationally disadvantaged secondary school students.

As requested by officials in each school district we studied, and as agreed with the subcommittee, we do not identify the school districts. We thank the districts that participated in this study for their cooperation.

Also as requested by the subcommittee, we did not obtain official agency comments or comments from the school districts. We are sending copies of this report to the Department of Education and others who are interested and will make copies available to others who request them.

Please call me (202-275-1854) or Lois-ellin Datta, Director of Program Evaluation in Human Services Areas (202-275-1370), if you need further information. Other major contributors to this report are listed in appendix V.

Eleanor Chelimsky
Assistant Comptroller General

Executive Summary

Purpose

The publication of A Nation at Risk in 1983—which decried "a rising tide of mediocrity" in public education that "threatens our very future as a Nation"—raised a national debate about the status of education in the United States. That it captured a widespread concern and a sensed need for change in education seems clear, given that, since 1980, 45 state legislatures have mandated additional high school graduation requirements. But these reforms have themselves raised new concerns about whether the challenge of additional requirements can well serve the needs of disadvantaged students.

At the request of the Subcommittee on Elementary, Secondary, and Vocational Education of the House Committee on Education and Labor, GAO conducted this study to answer three questions: (1) Have the education reforms that raised the requirements for high school graduation had an effect on the achievement of educationally disadvantaged students? (2) Have these reforms had an effect on dropout rates for those students? (3) Have these reforms had an effect on their enrollment in vocational education?

Background

Some educators have noted that adding graduation requirements, especially without remedial help, could simply discourage students who are already disadvantaged academically. (GAO defined "disadvantage" as a score below the 35th percentile on eighth-grade standardized reading achievement tests.) Additional required academic courses might also divert disadvantaged students from vocational education courses that arguably could better serve both their academic and occupational development. Other educators have pointed out that all students, including disadvantaged students, are motivated to learn if they must meet the academic reform requirements in order to graduate.

GAO examined student data from four large school districts in four states where comprehensive state-level reforms have been in effect long enough for a class of students to experience at least 3 years of high school under the new requirements. The legislated reforms affecting these districts included, for example, more academic course requirements for graduation and a passing score on an exit test. Districts serving large numbers of urban students were chosen to ensure data on large numbers of disadvantaged students. Minority students were also studied. The four districts provided computerized records for a total of about 61,000 students. From these records, GAO developed a design that used two test scores (in reading and mathematics achievement) for each of the four school districts, which yielded eight cases for analysis.

This is the first multistate study to empirically examine the effects of reform on performance, dropout rates, and enrollment patterns. These findings apply to the first group of students to enter high school under state-mandated reforms in these four districts. GAO's study design, which emphasized establishing the initial effects of the reforms, does not permit generalization to later student groups or to other districts.

Results in Brief

With regard to the performance of educationally disadvantaged students, education reform was neither a disaster nor a boon in the four districts examined. Disadvantaged students appear to have improved performance in three of the eight cases. However, these improvements were modest, and signs of improvement did not appear in the five other cases. Black students showed a pattern similar to that of disadvantaged students. Hispanic students showed no improvements associated with reform; however, this result derives from only six cases, because there were few Hispanic students in the two remaining cases (one school district). Although the reforms did not bring dramatic improvements for disadvantaged students, they were not excluded from the gains accruing to the nondisadvantaged students in these districts. Indeed, at least in these districts the latter were no more likely than disadvantaged students to show signs of improvement. (See pages 21-33.)

The effects of reform on dropout rates were mixed. Only two districts had sound data to identify dropouts. In one, the rate increased modestly after reform; in the other, it decreased modestly. (See pages 41-44)

Increased enrollment in academic courses after reform was associated with a decline in vocational enrollment for disadvantaged students (data were available for two districts). However, this decline was small on the average in both districts and occurred among nondisadvantaged students as well. Nevertheless, there are two possible concerns. First, the decline occurred entirely among the type of vocational education courses that prepare students for the labor market rather than among consumer or homemaking courses. Second, disadvantaged postreform students were somewhat less likely than disadvantaged prereform students to have scheduled five or more vocational courses over 3 years of high school. These findings suggest that at-risk students in these two districts may be receiving less occupational training than their prereform counterparts. (See pages 46-50.)

The small decreases in the average number of vocational education courses taken by all students in these districts translated into relatively

substantial decreases in total vocational education enrollment. Enrollment in vocational education courses declined 7 percent in one district and 11 percent in the other. Such declines raise concern that the availability of some vocational education courses and the number of vocational education teachers employed may be affected. (See pages 48-50.)

GAO's Analysis

GAO compared the performance, dropout rates, and enrollment patterns. The prereform students were the last group that entered the ninth grade before the additional graduation requirements were effective, and postreform students were the first group that entered the ninth grade under the new requirements. The student groups were 1 year apart except in one district in which they were 2 years apart because of a transition year in implementing the reforms.

Effects on Achievement

In contrast to the fear that reform efforts might neglect the special needs of at-risk students, educators in all four districts told GAO about a wide range of efforts to help these students meet the higher standards. For example, some districts used testing results to identify students needing tutorial help and then targeted remedial resources to them. Other districts added an instructional period to the school day to help students meet the new requirements. Others added basic skill applications to the coverage of topics in vocational education classes. (See pages 19-21.)

The three cases of improved achievement scores for disadvantaged students in the postreform group came from two school districts. In one district, both mathematics and reading scores improved; in the other district, mathematics but not reading scores improved. All these gains were modest, ranging from 5 to 8 percentile points for the median student. In the two other districts, neither mathematics nor reading scores improved after reform. (See pages 21-26.)

Even these modest gains may not have been real improvements. Students may have been learning only particular test questions or testing skills rather than materials that are educationally meaningful. GAO's study design did not allow the determination of whether the gains found were educationally real, as opposed to testing artifacts. However, the improvements may have been real. Achievement gains might have resulted from the redesign of curricular content and instruction practices to better match the existing skill base identified empirically in state assessment or achievement tests. It may be that this type of redesign of

curricula and instruction is more forcefully driven when test results have important consequences for the districts as well as for the students. Notably, in the two school districts that showed improvements, district officials had incentives to monitor schools on the results of the tests because they were required to provide additional services to students who failed to pass the state-mandated tests. (See pages 36-39.)

Effects on Dropout Rates

GAO analyzed dropout rates for the two districts that could provide data distinguishing students who quit school from those who left to continue their education elsewhere. The small effects of reform were not consistent between these two districts but were generally consistent for groups within each district. The dropout rate for disadvantaged students worsened by 3 percent after reform in one district but improved by 1 percent in the other. (See pages 41-44.)

Effects on Vocational Education Enrollments

GAO examined the enrollment patterns for academic and vocational education courses in two districts that could provide the necessary data. In both districts, disadvantaged students enrolled in more academic courses and fewer vocational education courses after reform. This apparent trade-off between academic and vocational education courses resulted in a modest decline in vocational education courses for at-risk students (about half a course, on the average). (See pages 45-50.)

How should one interpret the favorable indications of academic progress that GAO found in three of eight cases and the absence of strong negative findings in the remaining five cases? Since past evaluations have shown difficulty in achieving even modest gains for disadvantaged students, the mixed results reported here should not be dismissed. However, broader conclusions require data from more school districts. If further studies find similar or more favorable effects, evaluators should determine whether the test-score gains are educationally meaningful and the activities or approaches that seem to be responsible for the positive effects.

Recommendations

This report contains no recommendations.

Agency Comments

GAO did not request formal comments on a draft of this report.

Contents

Executive Summary		2
Chapter 1 Introduction		8
	Objectives, Scope, and Methodology	8
	The School Districts We Studied	9
	Defining Educationally Disadvantaged Students	11
	The Data We Used	12
	Implementation Issues	14
	Study Strengths and Limitations	16
Chapter 2 The Effect of Education Reform on Student Achievement		19
	Did Districts Target Help for At-Risk Students?	20
	Effects on At-Risk Students	21
	Effects on Black and Hispanic Students	26
	Effects on Higher-Achieving Students	32
	Possible Explanations for the Findings	36
	Conclusions	39
Chapter 3 The Effect of the Reforms on Dropout Rates for Disadvantaged Students		41
	Dropout Rates	41
	Conclusions	44
Chapter 4 The Effect of Educational Reform on Enrollment in Vocational Education		45
	Effects on At-Risk Students	46
	Effect on Students Not at Risk	47
	Discussion	48
Appendixes		
	Appendix I: Design and Measurement Issues	51
	Appendix II: Median Achievement Scores and Net Gain	57
	Appendix III: The Effects of Reform in Rural School Districts	61

Appendix IV: Related Multistate Studies 65
Appendix V: Major Contributors to This Report 68

Tables

Table 1.1: Characteristics of Four School Districts 10
Table 4.1: Average Number of Courses and Change in Number of Courses for At-Risk Students Grades 9 Through 11 46
Table 4.2: Average Number of Courses and Change in Number of Courses for Students Not at Risk Grades 9 Through 11 48
Table II.1: At-Risk Students 57
Table II.2: Black Students 58
Table II.3: Hispanic Students 59
Table II.4: Students Not at Risk 60

Figures

Figure 1.1: Prereform and Postreform Groups Across the Years of Test Administration in One District 13
Figure 2.1: Achievement of At-Risk Students (Median Percentile) 22
Figure 2.2: Achievement of Black Students (Median Percentile) 28
Figure 2.3: Achievement of Hispanic Students (Median Percentile) 30
Figure 2.4: Achievement of Students Not at Risk (Median Percentile) 34
Figure 3.1: Dropout Rates for At-Risk Students in Districts A and D 41
Figure 3.2: Dropout Rates for Students Not at Risk in Districts A and D 42
Figure 3.3: Dropout Rates for Black Students in Districts A and D 43
Figure 3.4: Dropout Rates for Hispanic Students in Districts A and D 44

Abbreviation

GAO General Accounting Office

Introduction

During the late 1960's and 1970's, the achievement test scores of students in the United States declined significantly. Serious concerns about this decline and the general condition of education in the United States were reflected in the 1983 report entitled A Nation at Risk: The Imperative for Educational Reform, produced by the National Commission on Excellence in Education. That report, along with several subsequent reports critical of U.S. education, received wide attention and helped fuel an education reform movement that had already begun in several states. Within that reform movement, 45 states have raised their graduation requirements since 1980, and many other reforms have been initiated in an attempt to improve student achievement.

These reforms are primarily aimed at three targets: teachers, school organization, and students. Reforms aimed at teachers include merit pay and certification examinations. Reforms aimed at school organization include smaller class size and lengthening the school day or year. Reforms aimed at students constitute a major portion of state actions and include legislation that has increased the number of academic courses required for graduation. Often, the total number of credits required has been increased as well. Many states have added a requirement that students must pass an exit test, designated by the state, to graduate, while other states have implemented minimum grade-point averages for participation in extracurricular activities and have limited the number of unexcused absences for obtaining course credit.

Objectives, Scope, and Methodology

The Subcommittee on Elementary, Secondary, and Vocational Education of the House Committee on Education and Labor posed three questions in requesting this study:

- Have the education reforms that raised the requirements for high school graduation affected the achievement of educationally disadvantaged students?
- Have these reforms affected the dropout rates of disadvantaged students?
- Have these reforms affected enrollment of disadvantaged students in vocational education?

As agreed with the subcommittee, we concentrated on reforms that have increased high school graduation requirements, because these reforms are more likely to have had direct and measurable effects upon student outcomes than other kinds of reform (changes in teacher licensing, for example). The reforms that we examined in this report, therefore,

include mandates that have increased the number of academic courses and have required students to pass exit tests to graduate. Our scope and methodology are described in the next four sections of this chapter.

The School Districts We Studied

We chose four states to study. When we began our work in spring 1987, 15 states had graduated a class of students under significant new high school course requirements, and 14 had implemented a requirement that students pass an exit test for high school graduation. (Since so few states had substantial experience with such reforms, national data on achievement, attrition, and vocational education would not be appropriate as a measure of their effect.) We selected from states that mandated various combinations of reforms aimed at high school students as part of comprehensive state reform legislation.

We needed to have available a number of years of computerized student data records from the school districts, for reasons that we will explain shortly. We selected districts with relatively high concentrations of educationally disadvantaged students to ensure that we would be able to detect any effect among this group.

The four districts varied in enrollment from 40,000 to over 200,000. Three served students living in urban and surrounding suburban areas. One served an exclusively urban population. One was located in the Northeast, two were in the Southeast, and one was in the Southwest. Most of the students in each district were black or Hispanic. The state legislative mandates implemented by these districts included varying combinations of

- requiring exit tests for graduation,
- increasing academic course requirements,
- tightening attendance rules,
- setting "no pass, no play" rules governing participation in sports and other activities, and
- requiring or making available varying degrees of remedial classes for those in difficulty.

We chose districts where previous local initiatives did not meet or exceed the new state standards. Each district we studied implemented changes in education practices affecting high school students in order to comply with major state mandates.

Other details of the four districts we studied are in table 1.1. As officials in each site requested, and as agreed with the subcommittee, we do not identify the school districts or their locations.

Table 1.1: Characteristics of Four School Districts

		Status of state mandates			Number of students		Year post-reform cohort entered grade 9	Ethnic enrollment		
District	Region	Major reform cohort affecting secondary students	School district response	Prior school district initiative	Pre-reform cohort	Post-reform cohort		White	Black	Hispanic
A[a]	Southwest	Passing an exit test required for graduation	Required for 1983-84 9th-grade cohort		8,992	8,685	1984–85	19%	50%	28%
		More English and mathematics credits required for graduation	Required for 1984-85 9th-grade cohort							
		Stricter attendance rules	Required for 1984-85 9th-grade cohort							
		Grades of "D" no longer passing	Required for 1984-85 9th-grade cohort							
		"No pass, no play" rule implemented[b]	Required for 1984-85 9th-grade cohort							
			District funded an extra period							
B	Northeast	Passing an exit test required for graduation	Required for 1985-86 9th-grade cohort		1,258	1,462	1985–86	10	64	26
		Remedial courses required for students failing sections of exit test	Remediation required for 1985-86 9th-grade cohort	Remediation provided for earlier cohorts						
C	Southeast	More mathematics and science credits required for graduation	Required for 1983-84 9th-grade cohort		2,165	2,255	1983–84	44	55	[c]
		Remedial help required for low achievers	Not fully implemented until 3rd year of reform							

(continued)

District	Region	Status of state mandates: Major reform cohort affecting secondary students	School district response	Prior school district initiative	Number of students: Pre-reform cohort	Post-reform cohort	Year post-reform cohort entered grade 9	Ethnic enrollment: White	Black	Hispanic
		Passing 4 courses required to participate in extracurricular activities	Passing all courses required of the 1983-84 9th-grade cohort to participate in extracurricular activities							
D	Southeast	Passing an exit test required for graduation	Required for 1983-84 9th-grade cohort		17,481	18,568	1983–84	23	33	43
		Extra period added in 3rd year of reform	Implemented in 3rd year of reform	Optional extra period provided in 1st and 2nd years of reform						
		Raised minimum passing grade	Not implemented							
		More science credits required for graduation	Required for 1983-84 9th-grade cohort							
Total					**29,986**	**30,970**				

[a]Reforms were mandated for this district over a 2-year period.

[b]"No pass, no play" rules stipulated that students must pass all courses in order to participate in extracurricular activities.

[c]Not applicable.

Defining Educationally Disadvantaged Students

The subcommittee was concerned about the effect of reform on the nation's most vulnerable students, those at greatest risk of school failure. We looked for effects on students at risk on a number of dimensions, including limited English proficiency and prior school difficulty. Data in the four districts' records were not consistent or complete enough, however, for establishing many categories.

We defined educationally disadvantaged students as those scoring at or below the 34th percentile on eighth-grade standardized reading tests.[1] We examined the progress of these at-risk students as they advanced—or were scheduled to advance—through high school. By our definition,

[1]We used the 34th percentile to identify at-risk students because many school districts use this score to determine eligibility for compensatory or remedial programs.

at-risk students are those who are educationally disadvantaged, not necessarily economically disadvantaged—although many surely are—as they enter high school. We use the terms disadvantaged and at-risk interchangeably in this report.

The Data We Used

We tracked the progress of the same group of students as they progressed from eighth grade through high school in terms of their performance on reading and mathematics tests using the school district data files. We tracked both low-achieving, at-risk students and higher-achieving students (that is, students not at risk). We examined the performances of two groups, or cohorts, of at-risk students: one group that did not have to meet the new graduation requirements (the prereform group) and one that did (the postreform group). We picked the last class to enter high school under prereform requirements and the first one to enter under postreform requirements. Thus, the principal reforms (increased course requirements and exit exams) were in effect throughout the high school years for the postreform group but did not directly affect the prereform group.[2]

In addition to asking us to examine effects upon at-risk students and students not at risk, the subcommittee asked us to analyze the effects of education reform upon minority-group students. Thus, we compared the performance of prereform and postreform groups of students separately for each minority group.[3]

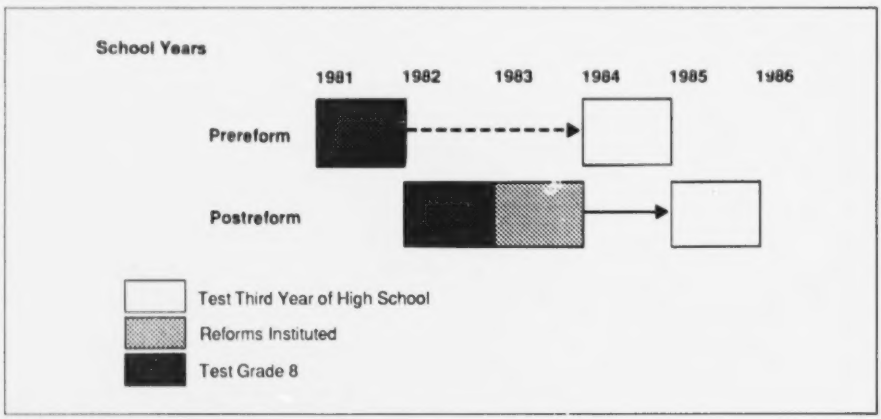
The four districts did not, of course, all implement their reforms in the same year, so we did not select the same years of test data for all four

[2]It is possible that some students in the prereform cohort could have been directly affected by the reform if they did not progress normally and thus graduated with or after the postreform cohort. We kept these poorer-achieving students in our analysis because removing them from the prereform cohort would have resulted in an unfair comparison with the postreform cohort. However, the measurable effect of reforms would be diminished as a result of some prereform students' being affected by reform for 1 or 2 years after entering the ninth grade. In any event, we do not believe their inclusion can have significantly affected our analyses. In two districts, this issue is not a concern, because students entering high school under prereform requirements were allowed to graduate under them, even if they did not progress normally. In the two other districts, students who were retained in a grade after entering grade 9 were only a small percentage (less than 10 percent in each case) of the students included in our achievement analyses and, thus, would have had a relatively modest effect on those analyses. Moreover, one of these latter districts had the measured improvements in both reading and mathematics, so any diminishment in measurable effect from retained students did not obscure the greater achievement improvements among the postreform cohort.

[3]These analyses were limited by the amount of data available—that is, the existence of a sufficient number of students in a minority group. This limitation prevented us from analyzing the effects of reform upon Asian students and upon Hispanic students in one district.

districts. Figure 1.1 illustrates how we went about selecting the prereform and postreform groups of students in one district. The lower row of the figure shows that, in this district, the reforms were instituted for the postreform group in the 1983-84 school year, when this group was entering grade 9. We tracked the progress of those ninth-graders through what should have been their junior year of high school in the 1985-86 school year. Within this cohort of students, we looked separately at the progress of both at-risk students and students not at risk.

Figure 1.1: Prereform and Postreform Groups Across the Years of Test Administration in One District



For comparison, the prereform group we selected was the last cohort of students that was not directly affected by the reforms, as shown in the upper row of the figure. In the district illustrated, we chose those who were first entering grade 9 in the 1982-83 school year—1 year earlier than the postreform group—and tracked them through 3 years of high school to the 1984-85 school year. Although both cohorts were students in the same schools in overlapping periods, the reform requirements applied to the postreform cohort only. Similarly, we selected cohorts from the three other districts. The central criteria were that (1) the postreform cohort had to be fully affected by reforms throughout the high school years and (2) the prereform cohort had to be the closest adjacent cohort that did not have to meet reform requirements. We adopted the latter criterion to keep from getting a prereform cohort that attended high school in a period of different values and culture than the postreform cohort and to ensure that test data would still be available. Our analyses trace the educational progress of two groups of students (the

at-risk students and those not at risk) through two periods (prereform and postreform).[4]

All four districts could provide computer records of basic demographic and achievement test data. All used a national achievement test (the Comprehensive Tests of Basic Skills in two districts and the Iowa Tests of Education Development and the Stanford Achievement Test in the other districts) and could provide percentile rankings for students. We discuss the statistical comparisons we make and the reasons why we selected these statistics when we present the achievement results in chapter 2. Only two districts had detailed withdrawal data that included records of transfer to other schools, so the analysis of dropout rates was restricted to these two districts. Only two could provide computer records of student transcripts for our review of vocational education course enrollments.

In all, we traced the progress of approximately 61,000 students as they moved through secondary schools, some starting as far back as 1982. The cooperation of the four school districts was essential to our work in assembling the large computer data files we requested.

Our study design took account of the need to obtain implementation information to understand and explain results. We discussed the implementation and results of the reforms in interviews with school district officials and with principals, teachers, and guidance counselors at a minimum of two high schools in each district. The interviews were designed to supplement the student data files by providing information on problems encountered in implementing the reforms and qualitative data on possible effects of reform that might not be apparent from an analysis of student data files. These issues have often been controversial in past evaluations.

Implementation Issues

The study of education reform efforts has always been a difficult undertaking. A fair evaluation must select a sample of appropriate projects, the effects examined have to be relevant to the goals of the projects, the reforms have to have been in implementation long enough to have been capable of having some effects upon students, and they have to have been strong enough for those effects to be logically attributed to the

[4]In one district, secondary school reforms were implemented over a 2-year period. Students who graduated in 1987 had to meet an exit test requirement; in 1988, graduates also had to pass additional academic courses. In order to look at the effects of both requirements, we compared the last prereform cohort with the second postreform cohort (classes of 1986 and 1988, respectively).

reforms. In the present evaluation, the interventions in the four school districts were typical of the comprehensive state actions that were being undertaken in this time period. Implementation was powerful in that the reforms were mandated by state law or policy and not simply advisory or optional for local school districts. State legislation in three districts required them to increase the number of courses needed to graduate. State mandates in two districts required students to pass an exit test to graduate, where no such requirement had existed before; a third district was ordered by the state to replace an earlier exit examination with a much more difficult one; the fourth district began to implement state requirements to provide remedial instruction to students who scored low on either a state basic-skills test or a standardized achievement test. State mandates required additional remedial courses or courses in particular areas in all four districts. The precise extent to which these requirements surpassed prereform requirements and the number of standards already reached by students are fair questions. We expect that most students not at risk would pass the exit tests and would not receive remedial services. Some of these students would have met or exceeded the new course requirements in order to satisfy college admission standards. The reforms in place in the districts we studied might not have had a major influence on the education of these students. However, we believe that these reforms were among the stronger reforms in place in large districts, and we are confident that our interviews have given us adequate knowledge of the degree and kind of implementation in the four districts.

With regard to the relevance of the measures of effect, the heart of the demand for education reform came from concerns about student performance—that is, the prolonged decline of achievement test scores. Concerns about possible increases in dropout rates were also prominent in the debates of the reform period. The nature of the reforms we found—proficiency testing, additional course work, more academic courses, remedial help, and the like—suggest a concern over these outcomes as well.

Another issue concerns the question of whether the reforms had been in place sufficiently long to be evaluated. This study includes a period of between 2 and 3 years (in one district, only 2 years of high school data were available), which seems to us a reasonable time to show an effect. This is usually considered an adequate period of time after an intervention has occurred for an evaluation to be reasonable. It is true that some reform programs are so complex that a longer time period may be needed before their outcomes can be fairly judged. This does not appear

to be the case in our districts; in any event, our study is likely to be the first of many studies by various individuals and organizations. This means that a body of research should become available to determine whether our results are replicated in other districts and in later school years.

Finally, in this particular study, another implementation issue concerns whether the reforms were relevant to at-risk children. That is, were the reforms addressed to them or to higher-achieving, precollege students? Further, were steps taken to help at-risk students meet the new requirements, or were they left largely as they had been? We address these issues at the beginning of chapter 2.

Study Strengths and Limitations

Strengths

This is the first study to report on how the education reforms introduced in the early 1980's and later have affected the performance of a sample of at-risk students from multiple states and school districts. Several elements of the study design constitute a strong test of the effects of these reforms. One strength of the study is the size and geographic distribution of the sample: approximately 61,000 students were included from four large school districts in four different states. A major problem in assessing the effect of the education reform movement from aggregate national data is that any small effects of particular changes or packages of reforms would tend to be overwhelmed by the large number of students not directly affected by those changes. We avoided this problem and strengthened the attributional potential of our study by focusing on districts in states where specific reforms were implemented. Our focus on states with reforms implemented and the large number of at-risk students included in our data base were intended to allow the detection of even relatively minor effects of education reform.

Our study was also designed to minimize the potential influence on our statistical analyses of long-term trends not related to reform. By comparing immediately adjacent classes (in effect, the last prereform and first postreform cohorts), we largely avoided the concern that our before-and-after comparisons might have been affected by major differences between the two groups related to long-term demographic or other

changes. That is, using an earlier cohort as the comparison group (for example, one that entered high school 5 years before the postreform group) would have diminished the confidence in the comparability of the two cohorts.

We designed our study to minimize the likelihood that differences in student outcomes resulted from comparing reform and nonreform groups composed of different kinds of people. In this study, we could not apply the experimental approach for ensuring comparability—that is, randomly assigning students to reform and nonreform experiences. One feasible option would have been to compare students in reform districts with similar students in nonreform districts, but we judged that it would have been difficult to closely match a small number of reform and nonreform school districts in terms of all the background factors that might affect student outcomes. In contrast, we chose to compare reform and nonreform students in the same district but adjacent cohorts because it is reasonable to assume that a cohort is similar to its adjacent cohort in terms of many background factors.

Limitations

A limitation of the study is that our design does not allow the generalization of our findings to school districts nationwide. They apply only to the school districts we studied. As already noted, the study design we used emphasized establishing the effects of reform on at-risk students (internal validity) rather than determining the degree to which those effects were typical nationwide (external validity). This derives from the fact that our requesters' question was focused on the former, not the latter.

Another limitation concerns the possible disadvantages of using adjacent cohorts in the same school district as the experimental and comparison groups. We cannot exclude the possibility that reforms technically applicable only to the postreform cohort also affected outcomes for the prereform group, who would still have been in school during part of the study period.

Some of the consequences of increased course-taking may not have been reflected in our data. Students might not have enrolled in the newly required courses until their junior year, and if students were retained or had to repeat courses, it might not be until their senior year that the additional requirements were met. The high school test scores we used might have been earned before students enrolled in the extra courses and this would have had a conservative influence on our findings.

Achievement tests were not routinely administered to 12th-grade students in the districts we studied. In three districts, students took achievement tests for the last time in their junior year; in one district, in their sophomore year. We used the scores from these tests because they were the last high school scores available.

The achievement measure we used might not record some types of changes in educational attainment. The achievement tests used by the districts we studied are relatively low-level tests that are oriented toward minimum or basic skills. If the districts taught more or less higher-level skills such as inferential thinking, problem-solving, and analysis as a result of reform, the test might not reflect these changes. This could also have had a conservative influence on our findings.

Because we had no practical way to check the accuracy of student records independently, we did not verify the data provided by our four districts. We did, however, examine the data for values that were obviously incorrect and removed these few cases from the analyses.

We did not request formal comments on our report from the school districts or state agencies involved. Our work was conducted in accordance with generally accepted government auditing standards.

The Effect of Education Reform on Student Achievement

Some people have argued that disadvantaged students—those who reach high school already achieving poorly—or students who are members of minority racial or ethnic groups might find the increased requirements of education reform an insuperable barrier to graduation. Educationally disadvantaged students might face additional obstacles to completing school without receiving resources and assistance to help them meet new, higher standards. Thus, one guess about the likely effects of the higher hurdles set by reform has been an expectation of student failure. Further, it is possible that only the students who were already academically prepared to meet the challenge of the additional requirements mandated by reform might reap educational benefits. This scenario says that achievement scores could rise for nondisadvantaged students but decline for those who are disadvantaged.

However, many legislators and school officials have argued that the reforms could have their intended effect. According to this hypothesis, the changed legal framework of increased requirements would be translated by teachers into higher expectations for all students, better identification of learning gaps, and increased services to help low-achieving students bridge those gaps. Students might gain in achievement because they were more motivated and exerting more effort in order to meet the new requirements. Also, educationally disadvantaged students might be more likely to enroll in additional academic courses to meet raised graduation requirements and might benefit more from increased exposure to academic material as a result of reforms than higher-achieving students. Indeed, many higher-achieving students have, in the past, scheduled academic courses that met or exceeded reform requirements in order to meet college admissions requirements, and they did this long before reforms were implemented. In this view, at-risk students would be even more likely to benefit from reform than more academically advantaged students.

Under the second hypothesis, disadvantaged students can be expected to benefit from reform. But under the first, they would be likely to benefit only if assistance were available to them to help them meet the higher requirements put in place by reform. We looked in our four districts for efforts to help educationally disadvantaged students in the new reform climate.

Did Districts Target Help for At-Risk Students?

We found evidence that educationally disadvantaged students were not being ignored in the four districts. Educators in all four informed us of a wide variety of local initiatives—exceeding state or previous district regulations—to help students meet the higher standards. Some of these efforts—for example, lengthening the school day, reducing the size of classes, and changing the way some students were grouped for instruction—were aimed at the way schools were organized and had the potential of helping all students. Other efforts were aimed at curriculum and instructional practices and affected groups of students likely to have difficulties meeting the new requirements. Still others, such as increased remedial instruction and support services, were aimed specifically at individual, at-risk students.

All four districts implemented changes in the organization of secondary schools to help students schedule additional courses or acquire basic academic skills needed to pass state tests. These efforts included, for example,

- providing an official additional period in the day, even when the state did not fund it, to help students take all required courses;
- offering an optional additional period in the day, at district expense, to help students meet new course requirements;
- providing self-contained or cluster programs for students needing extensive help in acquiring basic skills; and
- reducing the size of classes in targeted schools or subject areas.

Officials in all four districts, including districts where the exit tests were "low-risk" (that is, passed by almost all students) also mentioned changes in curriculum and instructional practices that were implemented to help students pass state tests. These changes included aligning curriculum to reflect skills measured on state tests and incorporating basic skill material within the contents covered in vocational and general classes. In one district, basic-skills teachers are required to develop individual improvement plans for low-achieving students to target instruction on specific skills needed to pass exit tests.

Along with efforts aimed at school organization, curriculum, and instructional practices, all four districts provided remedial activities for students experiencing difficulties with the new requirements. These efforts included

- regularly scheduled remedial help in basic skill areas;
- voluntary tutorials during, before, and after school or on weekends;

- summer work-study programs; and
- increased individual attention from counselors.

Effects on At-Risk Students

The key question for this study in comparing student achievement before and after the introduction of the reforms was whether there were benefits for at-risk or minority students as well as for students not at risk. Data from our four districts showed that at-risk students did not consistently fall behind after the reforms, as had been feared. Indeed, we found some test score changes showing students gaining more from school after reform than before, and this was true both for low-achieving and higher-achieving students. However, these gains, overall, were modest.

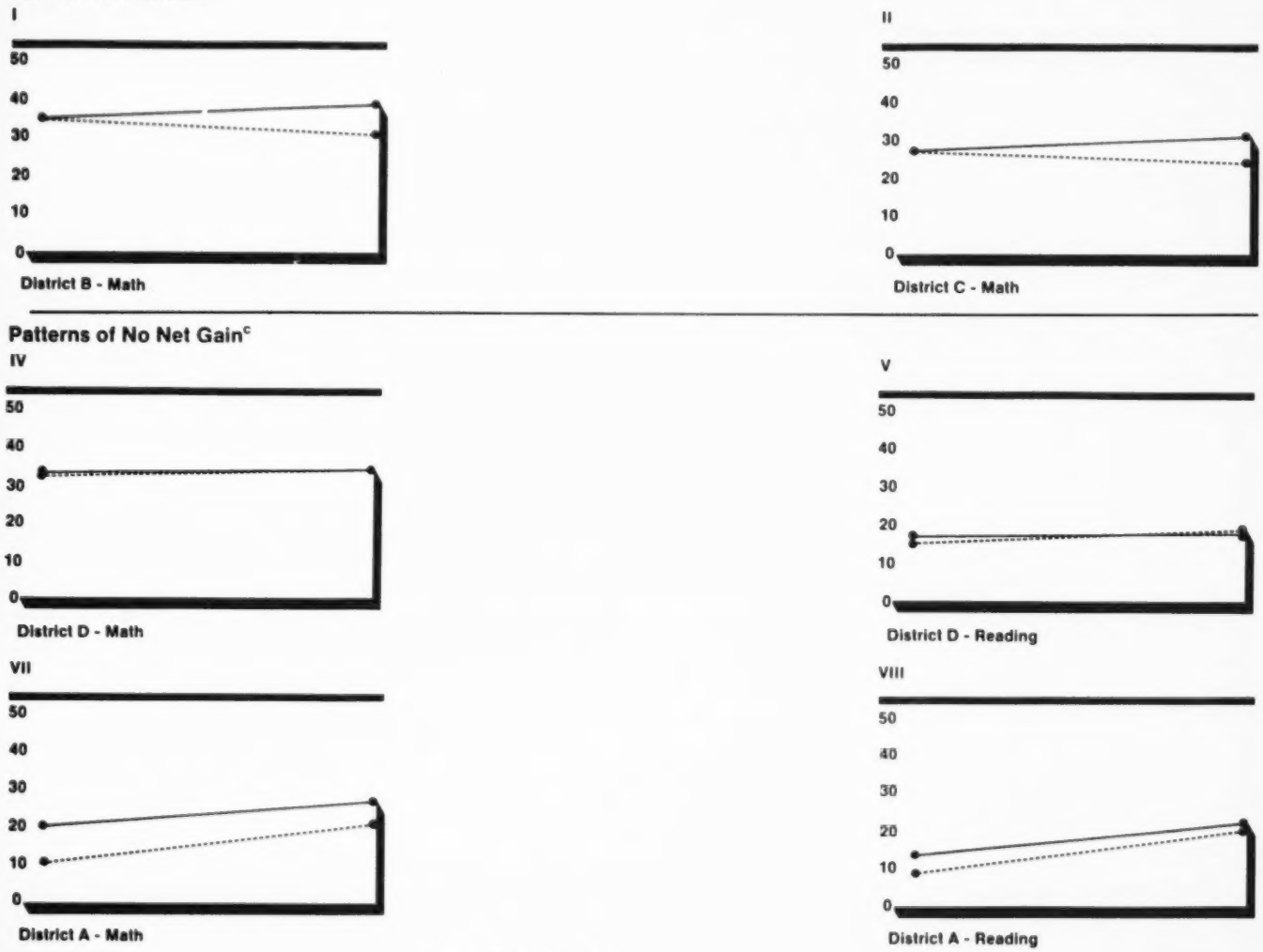
We looked for evidence that the reform benefited the students' achievement in terms of a net gain in median achievement scores.[1] We assumed that if the reforms were beneficial, the change in postreform students' achievement scores would improve relative to those of prereform students. The measure of reform benefit, or net gain, is that the median postreform group score increases more or declines less between grade 8 and high school testing than does the median prereform group score. Thus, we compared two cohorts of at-risk students (prereform and postreform) in four cities on two achievement measures each—reading and mathematics—for a total of eight comparisons of achievement scores.

Our results included both positive and negative findings. We found no gain associated with the reform for five of these eight outcomes, as shown at the bottom of figure 2.1.[2] The most negative context of these was in District B, where we see not only no gain but also a decline by the third year of high school for both the prereform and postreform groups in reading achievement. Further, the decline was slightly sharper for the postreform group. This group started grade 8 slightly worse off than the prereform group (at the 22nd percentile versus the 23rd) and dropped to the 15th percentile, thus declining 7 percentile points, or 1 more than their predecessors.

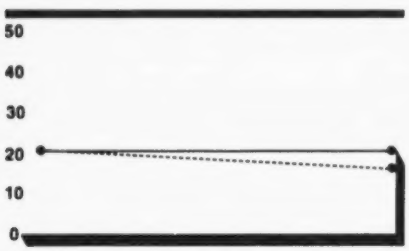
[1]The median score is the middle score—that is, the score above which half of the students scored and below which the other half scored. We used medians rather than means as summary scores for the cohorts because percentiles are not appropriately summarized by means. Percentile ranks are not made up of equal measuring units. For instance, the number of additional correct answers needed to improve a student's rank between the percentile ranks of 5 and 10 is greater than the number needed to improve between the percentile ranks of 50 and 55. Since the computation of means requires equal measuring units but the computation of medians does not, we chose to analyze median percentiles.

[2]The data for this and other figures appear in tabular form in appendix II.

Figure 2.1: Achievement of At-Risk Students (Median Percentile)[a]

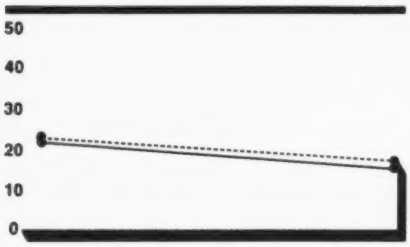


III



District C - Reading

VI



District B - Reading

[a]The graphs compare the achievement scores of the prereform and postreform cohorts at two time periods. For districts A, B, and D, the scores were measured during the eighth grade and after 3 years of high school; for District C, during the eighth grade and after 2 years of high school.

[b]The figure shows two patterns of net gain. In graphs I and II, the scores declined for the prereform cohort but increased for the postreform cohort. In graph III, the scores declined for the prereform cohorts but did not change for the postreform cohort.

[c]The figure shows two patterns of no net gain. In graphs IV, V, VII, and VIII, scores increased for both cohorts but gained less for the postreform cohort. In graph VI, scores declined for both cohorts but declined slightly more for the postreform cohort.

How do we assess the four other cases of no net gain? In District A, the prereform group had a pattern of increased performance scores from grade 8 to the third year of high school. In District A, the postreform group also improved its percentile standing in both reading and mathematics relative to the norms. Furthermore, the postreform group had notably higher test scores after 3 years of high school than the prereform group. But the growth rate of the postreform group in high school was lower than that of the prereform group. (This finding is reflected by the somewhat steeper lines shown in the graph for the prereform group in District A.) Moreover, the postreform group had a much higher initial grade 8 performance than the prereform group. These higher grade 8 scores might have resulted from changes in the community, in testing practices, or in attrition or might have represented stronger performance at the elementary grades.[3] In any case, the postreform group's initial advantage (defined as the gap between the prereform and postreform groups) faded somewhat in high school, despite reform efforts.

We found two other examples of slightly lower rates of gain after reform. In District D, the postreform group started slightly ahead of the prereform group in both mathematics and reading but lost these advantages and ended up only equal to, or slightly lower than, its predecessor by the final testing year.

With regard to our positive findings, the upper part of figure 2.1 shows three clear examples of positive change in the performance of educationally disadvantaged students. Note that in all three cases, the postreform groups' median percentile scores increased or remained stable during high school, while the prereform group declined. In short, in

[3]The consistently higher scores for the postreform cohort in District A could have resulted from either biased attrition by low-achievers or initial differences between the prereform and postreform cohorts. This pattern could occur if low-achieving postreform students were less likely to take the high school test (whether from increased dropping out, changed district testing policy, or some other reason). If this were true, our analysis (which excludes students who did not take the high school test) would show initial and later higher scores for the postreform cohort because some low-achieving students would be systematically excluded from this cohort. This hypothesis is more plausible because drop-out rates increased slightly in District A, which could indicate larger numbers of low-scorers were removed from the postreform cohort. We conducted special analyses to examine this issue and conclude that at-risk, postreform students' higher scores appear to have resulted primarily from initial differences rather than differential dropout. Part of the greater-than-expected initial differences result from the reform transition year that separated the cohorts in this particular district. At-risk students' scores in the transition year fell between those of students in the preform and postreform, suggesting a trend of pre-high-school achievement improvements that widened the achievement gap between nonadjacent cohorts. Moreover, a comparison of all grade 8 test-takers (who may or may not have taken the high school test) reduced the gap in initial scores between the prereform and postreform cohort by less than half, indicating that differential dropout is only a partial explanation of the higher scores among the at-risk students in the postreform cohort.

these three cases, the postreform group of disadvantaged students both improved or maintained their performance relative to the national norms and improved relative to the prereform group (which, in fact, declined). These three positive effects were found in District C in both reading and mathematics and in District B in mathematics. All three positive effects, however, were relatively modest, since the differences in median changes between prereform and postreform groups ranged from 5 to 8 percentile points (see appendix II).

We did not do tests of significance on our results because we analyzed differences between all test-takers in the districts rather than between samples of test-takers. Moreover, given the large number of students we analyzed, tests of significance at conventional levels of significance might be likely to indicate that even very small or negligible changes were statistically significant.

Our findings did not appear to be dependent upon year-to-year fluctuation in test scores or long-term improvements in the districts.[4] Long-term district improvements would have been suggested if we found a trend of improving performance among earlier cohorts. Although we did not have data on earlier cohorts, the fact that the scores declined for the prereform cohort but increased or remained stable for the postreform cohort, except for reading scores in District B, suggests that the improvement broke with, rather than continued, a long-term trend in the district.

We also checked our data to see if differences in achievement may have resulted from age differences between the cohorts. If the postreform cohort consisted of more students who were overage for their grade placement than in the prereform cohort, we would expect the postreform cohort to perform better on achievement tests, because norms for these tests are based on grade norms rather than age norms. We found that the performance of overage students in the preform and postreform cohorts differed by less than 1 percent in all four districts.[5]

[4]In districts A, B, and D, in which we could inspect the net gains in the second high school year, our findings of net gain are essentially consistent with those for the third year of high school that we have reported. Our conclusion about patterns of net gain or no net gain would change in only one of the six comparisons, and this one exception—a change from a weak pattern of no net gain (minus 1) to a weak pattern of net gain (1)—suggests a relatively small year-to-year random fluctuation in test scores that could not explain the sizable net gains we observed in our three cases of positive effects.

[5]In District A, the percentages of overage students in both cohorts was 9.1 percent. In District B, 10.6 percent of the prereform and 11.4 percent of the postreform cohort were overage. In District C, the percentages of overage students in the prereform and postreform cohorts were 21.7 and 22.4. In District D, the percentages were 17.1 and 17.8.

These achievement results indicated that at-risk students, on the average, definitely have not suffered "disasters" as a result of education reform in these four cities, and in some instances they seem to have prospered. But our findings on the eight outcomes were both mixed and modest.

Effects on Black and Hispanic Students

We paid special attention in our study to the effects of education reforms on minority students. We move now to the results for all black and Hispanic students, not just students with lower grade 8 test scores.

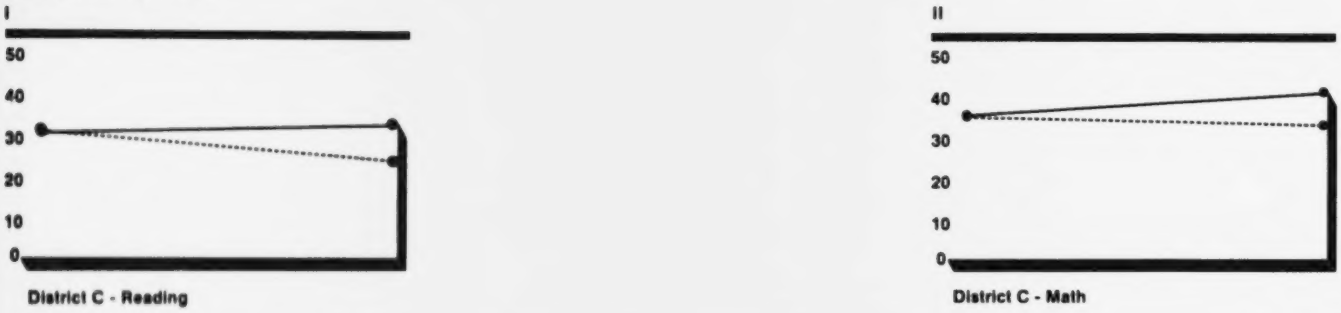
For blacks, the results were about the same as we reported for students educationally at risk: three cases of overall net gain, five cases of no net gain. (See figure 2.2 on page 28.) The only difference was for reading in District D. Neither blacks nor disadvantaged students appeared to benefit from reform in District D, but postreform disadvantaged students' reading scores improved between grade 8 and later testing (see figure 2.1), whereas postreform black students' scores declined. Figure 2.2 thus shows two cases of greater decline after reform for black students (graphs VI and VIII), compared to only one for low-achieving students.[6]

[6]District A postreform black students had higher scores at grade 8 and after 3 years of high school than prereform black students (the good news) but their relative advantage faded during high school (the bad news).

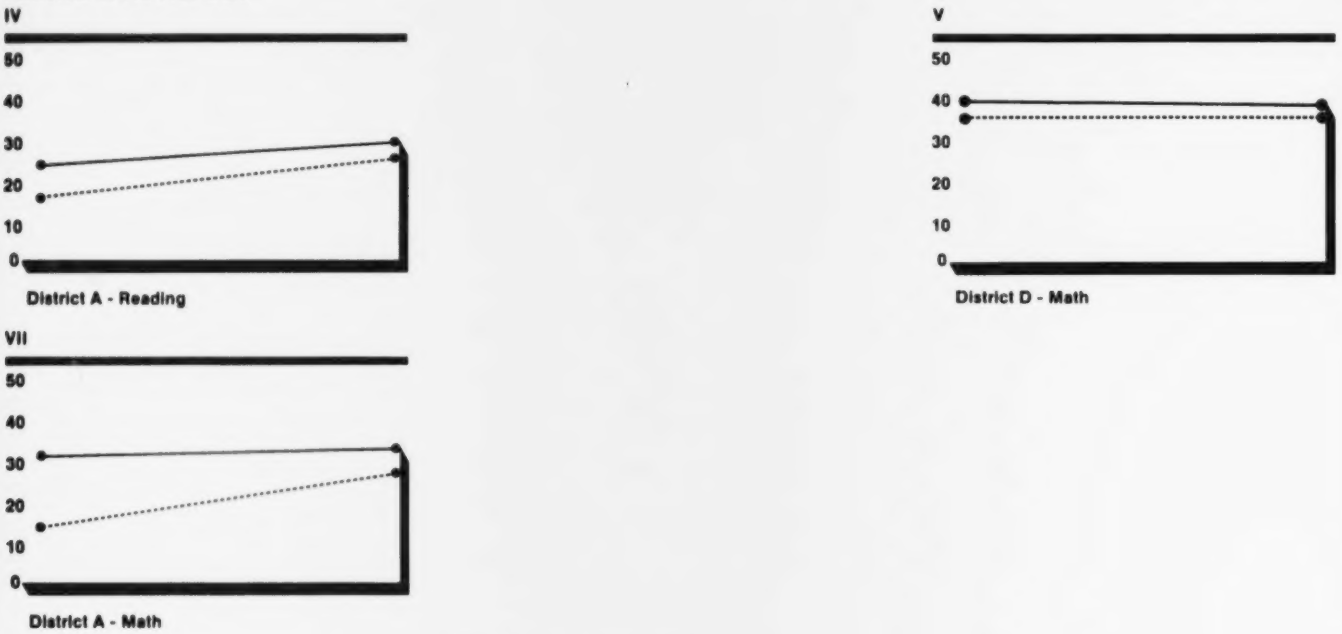
For Hispanics, we had data for only six comparisons instead of eight, because of the very small Hispanic student population in District C. Our results were all negative: they showed no instances of net gains for the postreform group and two cases of greater decline after reform than before. Figure 2.3 on page 30 shows the reading decline for Hispanics in districts B and D, which worsened slightly after reform. Two other results—mathematics in districts B and D—show that the Hispanic students' performance relative to national norms declined somewhat during high school for both the prereform and postreform groups. The postreform Hispanics in District A did improve their reading and mathematics scores over time, but after having had much higher initial levels at grade 8 compared to prereform students, they followed this by making no net gains in the rate of improvement. This was the same pattern that we had already seen for blacks and at-risk students in District A.

Figure 2.2: Achievement of Black Students (Median Percentile)[a]

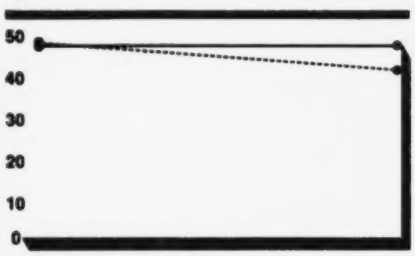
Patterns of Net Gain[b]



Patterns of No Net Gain[c]

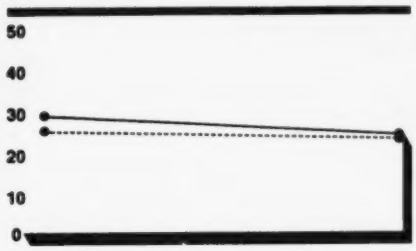


III



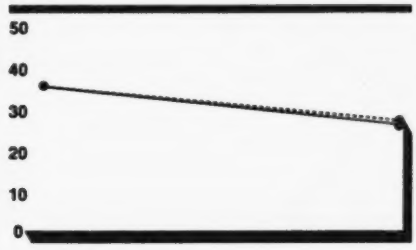
District B - Math

VI



District D - Reading

VIII



District B - Reading

[a]The graphs compare the achievement scores of the prereform and postreform cohorts at two time periods. For districts A, B, and D, the scores were measured during the eighth grade and after 3 years of high school; for District C, during the eighth grade and after 2 years of high school.

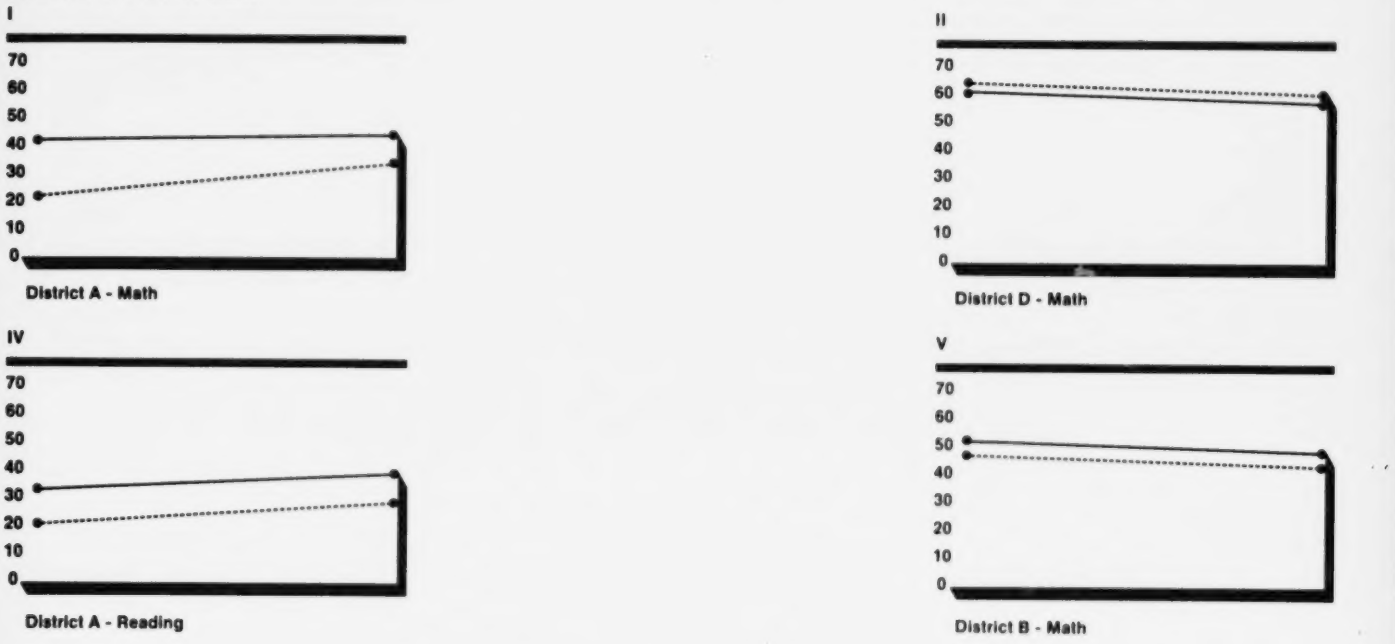
[b]The figure shows one pattern of net gain. In graphs I, II, and III, scores declined for the prereform cohort but increased or remained the same for the postreform cohort.

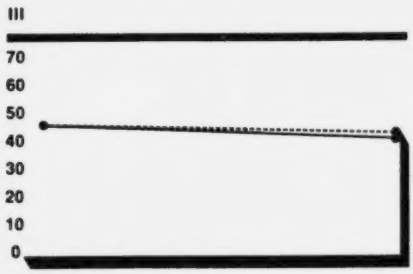
[c]The figure shows three patterns of no net gain. In graphs IV and VII, scores increased for both cohorts but gained less for the postreform cohort. In graph V, scores remained almost unchanged before and after reform. In graphs VI and VIII, scores declined for both cohorts but declined slightly more for the postreform cohort.

Figure 2.3: Achievement of Hispanic Students (Median Percentile)[a]

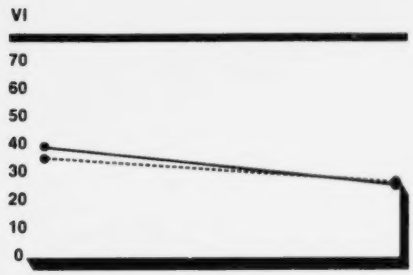
Patterns of Net Gain - No Instances

Patterns of No Net Gain[b]





District D - Reading



District B - Reading

[a]The graphs compare the achievement scores of the prereform and p streform cohorts at two time periods. The scores were measured during the eighth grade and after 3 years of high school.

[b]The figure shows three patterns of no net gain. In graphs I and IV, scores increased for both cohorts but gained less for the postreform cohort. In graphs II and V, scores declined equally before and after reforms. In graphs III and VI, scores declined for both cohorts but declined slightly more for the postreform cohort.

In short, our finding from these three districts is that the education reform experience has not helped Hispanic students. Our results for these groups were all negative. (Since there were few Hispanic students in the otherwise successful District C, we cannot tell what their performance might have been there or how it might have changed this overall showing).

Effects on Higher-Achieving Students

We also traced the experience of higher-achieving students not at risk: that is, those scoring at and above the 35th percentile in grade 8 reading. We used these results as another yardstick against which to measure the results for low-achieving students and for minorities, but they are, of course, interesting in and of themselves.

We found that the better students did about the same as disadvantaged students in benefiting from reform. (See figure 2.4 on page 34.) That is, the students not at risk also had three instances of net gain out of eight comparisons. District C again showed net gains in both reading and mathematics. The District A mathematics results were positive in that the prereform group's decline improved slightly after reform.

In terms of score changes among postreform students, our results suggest an apparently weaker performance by better students than by disadvantaged students, but this observation must be interpreted with caution. There are four instances of no net gain in which the scores for the students not at risk in the postreform group declined (reading and mathematics in District B and reading and mathematics in District D) compared to only one decline for at-risk students (figure 2.1). When groups have been selected for extreme scores—as here for at-risk students and, to a lesser extent, students not at risk—there is a statistical tendency for the scores of the higher group to decrease and the scores of the lower group to increase upon retesting.[7] For this reason, the larger number of declining scores among better students compared to disadvantaged students could reflect either a real difference or only a statistical artifact.

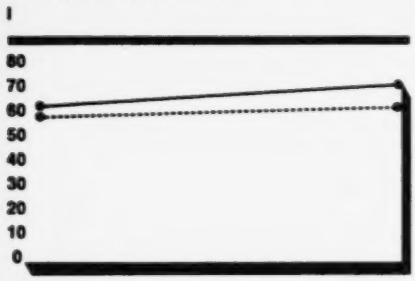
[7]This statistical tendency is known as "regression toward the mean." It is related here to the imprecision of the achievement testing process that results in measurement error. The more extreme the score, the more likely it is to include larger errors. Thus, a very low scorer is more likely to have larger error from the true score in the negative direction, whereas a very high scorer is likely to have larger error in the positive direction. Since measurement error has a random component, the low scorers would be expected to improve on average upon retesting, and the high scorers decline somewhat on average. Thus, measured scores would change without changes in true scores.

In summary, we found that education reform in these four school districts did not produce more favorable results for nondisadvantaged students than for disadvantaged students. How can we explain these results? Since we had included students at and above the 35th percentile in our category of nondisadvantaged students, the group incorporated students presenting a fairly wide range of performance, and it seemed possible to us that this wide range might have obscured favorable results occurring within smaller subsets of this nondisadvantaged group. Therefore, we examined the group that scored between the 35th and 50th percentiles separately. However, we found the results generally to be the same.

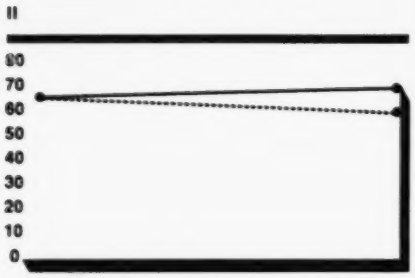
These findings for students not at risk can be viewed as a yardstick for evaluating our results for at-risk students. That is, these findings show that the reforms have similar rather than differential effects for both groups. Of course, these results are limited, and we would want to see if data from other districts support this conclusion.

Figure 2.4: Achievement of Students Not at Risk (Median Percentile)[a]

Patterns of Net Gain[b]



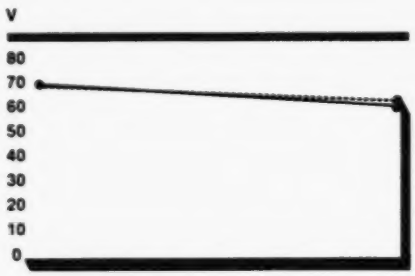
District C - Math



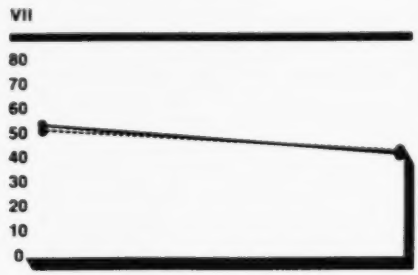
District C - Reading

Patterns of No Net Gain[c]

District A - Reading



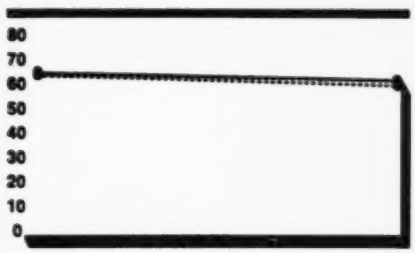
District D - Reading



District B - Reading

Postreform cohort
Prereform cohort

III

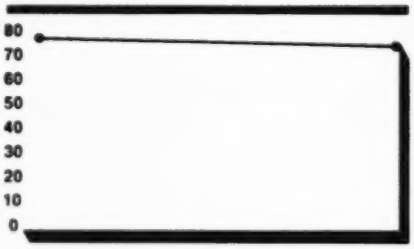


District A - Math

VIII

District B - Math

VI



District D - Math

[a]The graphs compare the achievement scores of the prereform and postreform cohorts at two time periods. For districts A, B, and D, the scores were measured during the eighth grade and after 3 years of high school.

[b]The figure shows three patterns of net gain. In graph I, scores increased for both cohorts but gained more for the postreform cohort. In graph II, scores declined for the prereform cohort but increased for the postreform cohort. In graph III, scores declined for both cohorts but declined less for the postreform cohort.

[c]The figure shows three patterns of no net gain. In graph IV, scores increased for both cohorts but gained less for the postreform cohort. In graphs V, VII, and VIII, scores declined for both cohorts but declined slightly more for the postreform cohort. In graph VI, scores declined equally before and after reform.

Possible Explanations for the Findings

The major strength of our design was its ability to detect broad changes in the performance of large cohorts of students. To help explain the trends and differences we found among the four school districts, we interviewed selected school officials and teachers in each district. The purpose of the interviews was to explore the nature of the reforms, their implementation, and possible explanations for our findings in the analyses of test scores for the school district.

Districts B and C

One finding of particular interest is the encouraging results for at-risk and black students in districts B and C, which we reported in figures 2.1 and 2.2. It is not clear which reform element (or combination of elements) might have been most important in achieving the benefit for at-risk students in these two districts. In District C, the reforms implemented were largely raised graduation requirements calling for additional mathematics and science credits and a requirement for passing grades to participate in extracurricular activities. District C also required students to take a competency test.[8] In District B, reforms included passing an exit test to graduate and mandated remedial instruction for students who failed any part of that test.

Officials and teachers in these districts offered various explanations for the benefits accruing to students from these reforms. They associated gains with improved instructional practices, curriculum revision and alignment, the infusion of basic-skill instruction into general curricula, improved teacher training, and greater teacher expectations. We were also told that many teachers were teaching skills measured on state exit or national achievement tests used by the districts and that this practice had increased because of the increased significance attached to test scores.

While the local informants could have been correct about the intrinsic value of remedial programs, those programs were unable to explain our results in any straightforward manner, because remediation was implemented on a different time schedule than the increased student requirements. Remediation was not implemented at all during the first year of reform in District C and was only partially implemented in the second year, when we measured gains in this district. In District B, more students received remedial instruction during the year before reforms were

[8]This requirement has subsequently been extended to a required exit examination, but the competency test was in effect during the period through the posttest data reported in this chapter.

implemented than during the period between the pre- and posttesting for the postreform students.

The achievement gains may be better explained by the alignment of instruction and curricula to test-taking. The comments of officials in both districts suggested that tests may be major factors in instruction and curricula. District B officials indicated that many more students had failed the relatively difficult mathematics section of the exit examination than had failed sections calling for language-arts skills. More district attention, therefore, was directed to teaching mathematics skills called for on the exit test, infusing basic mathematics skills into general courses, and aligning the mathematics curricula with the exit test. Also, District B officials indicated that items on the mathematics section of the exit test closely resembled items on the mathematics subtest of the standardized achievement test used in the district. This information was consistent with the nature of the improvements found in District B; namely, the gains were found in mathematics but not in reading.

The state competency test in District C also seemed to have played a role in linking instruction and curricula to the general skills or type of items covered in the achievement tests. Reforms there included a state basic-skill assessment program under which students were tested at several grade levels during their elementary, junior high, and high school careers. We were told that curricular, instructional, and promotional decisions were closely tied to performance on this test. District officials related gains to the comparability of the state competency test and the standardized achievement test used in this district. The latter test was selected by the state because of its close fit with the state competency test. We are unable to distinguish whether increases in scores reflect improved mastery in basic skill areas, test items, or both.

We did not find any information that would explain the absence of gains either for Hispanic students or for students not at risk in District B (see figures 2.3 and 2.4).

Districts A and D

The reason why at-risk students did not benefit in districts A and D as they did in the two other districts is not immediately apparent, because reforms in all four districts were similar. In order to graduate, postreform students in districts A and D were required to pass an exit test and earn additional academic credits. Also, district officials reported similar local responses to reforms—improvements in instructional practices, greater teacher expectations, and attempts to teach skills measured on

exit exams. Why were gains observed in districts B and C and not in districts A and D?

One reason might have been that instruction and curricula seem not to have been so greatly founded on exit examinations in districts A and D. The exit examinations there were low-risk tests; about 1 percent of the graduating class in District D and 2 percent in District A failed to pass them. In addition, poor results on these tests were less costly, since they were not associated with mandates to provide remedial instruction and the subsequent need to hire additional teachers and allocate classroom space for remediation.

Are the Achievement Gains Real?

One possibility raised by the explanation of curriculum and instruction realignment above is that the gains we reported in districts B and C were not educationally meaningful. During our site visits to all four districts, we were told that in the face of new testing requirements, some teachers were "teaching to the test." "Teaching to the test" could mean at least three things: training on exact test items, coaching inexperienced students on test-taking skills, and focusing instruction on skills covered by the test.

The first meaning—practicing the same questions that will later be asked on a specific test—is viewed as having little educational value. Higher scores shown by a group with advanced training on exact test items compared with an earlier group lacking such practice are not educationally meaningful gains.

The educational value of the second meaning—training possibly inexperienced students on test-taking skills—is disputed. Some experts see this as more fairly revealing what students have actually learned and leveling the playing field between more- and less-experienced students for important tests such as those influencing scholarship awards and college entry. Ability to do well on standardized or multiple-choice tests can influence achievement throughout postsecondary education and at least some life opportunities such as entrance into postgraduate training, earning required professional licenses and certificates, and some job selection. Thus, teaching students how to take tests can be seen as a valid aspect of the secondary school curriculum. Differences between pre- and postgroups attributable to superior test-taking skills would not be interpretable, however, as differences in more generalized knowledge.

The third meaning—focusing instruction on skills covered by the test—quickly gets into complex issues. Where the state or locality has carefully identified skills considered essential for students to learn, and then has developed fair assessments of whether the students have acquired this knowledge, many education experts would agree that focusing instruction on these skills represents significant learning opportunities. Opinions may differ, of course, on whether the skills originally selected have been optimally chosen, and how broadly or narrowly the tests may assess this knowledge, but in this context, focusing instruction on skills taught by the test is considered educationally appropriate and meaningful.

Thus, the efforts of District C and others to improve the link between the curricular and the testing programs are not necessarily negative findings if they stem from more-intense, effective teaching of general skills, because higher scores could be interpreted as reflecting better-prepared graduates. Similarly, it is appropriate to modify a curriculum to include all the educationally important areas or domains tapped by the test. However, improvements in test scores compared with those of prior groups of students do not necessarily represent greater learning. The curricula and instructional practices may have been different but educationally sound both before and after reform. The "gains" may simply reflect a more appropriate or "fairer" test that taps the postreform domains. These issues are sufficiently complex that they cannot be resolved with our initial field study.

Conclusions

Our analysis of these data leads us to three findings and three observations. First, in our four sites, educational reform did not result in either marked losses or substantial gains for educationally at-risk students. When improvements occurred, they were modest. While some cases of net gain exist, a majority of our comparisons found no net gains. Second, black students showed a very similar pattern to that of the at-risk students. Third, based on data from three districts, Hispanic students showed the least-favorable trends in reading and mathematics scores. Not only were there no net gains for Hispanics from reforms but their median scores declined over time in most cases. This was the only group we studied that did not appear to share at all in the gains associated with reform in some places.

A first observation based on these findings is that what some had feared did not occur: reforms did not provide greater benefits to more-advantaged students than to disadvantaged students.

A second observation concerns the interpretation of the favorable indications of academic progress that we found in three of the eight cases and the absence of strong negative findings in any of the remaining five cases. Since past evaluations have shown the difficulty in achieving even modest gains for educationally disadvantaged students, the mixed results reported here should not be dismissed. However, broader conclusions require data from more school districts. One way of providing this information would be through a major national evaluation study of school districts with varying experience with education reform. Another way would be to accumulate school district studies of the effects of education reforms that cover a range of reforms and time periods. If further studies find similar or more favorable effects, evaluators should determine whether the test-score gains are educationally meaningful and the activities or approaches that seem to be responsible for the positive effects.

The third observation is that further review and study of the type of state mandates that force changes in curriculum and instruction may also be warranted. There may be real educational benefits in a program that more closely links curricular and instructional content to testing, but this may be more likely to occur when test results have important consequences for districts as well as students. In contrast to districts A and D, districts C and B responded to state mandates that required compulsory remedial instruction for all students who scored below minimal ceilings on state assessment tests. Because results on tests in these districts had a direct effect on the quantity of services that had to be provided, district officials were likely to place much emphasis on the results of these tests. This appears to be a strong factor in curriculum realignment in our two districts that showed achievement gains. This observation is based on the experience of only four school districts, which means that it must be treated more as a hypothesis than as a conclusion.

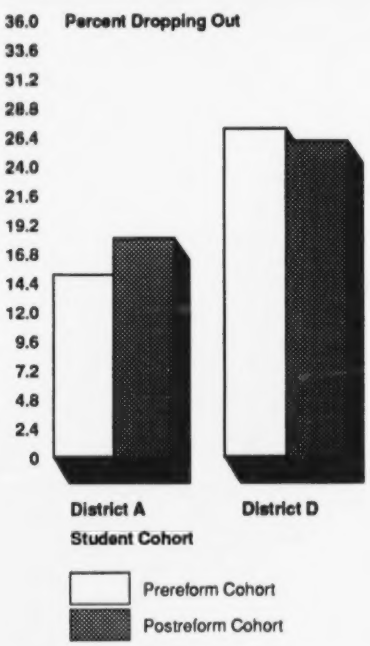
The Effect of the Reforms on Dropout Rates for Disadvantaged Students

Dropout Rates

The next questions we asked were whether educationally disadvantaged students quit school more in the postreform period under the pressure of the new academic requirements and whether they quit school more than other students. Two of the four districts provided data that allowed us to calculate dropout rates in the prereform and postreform cohorts. These districts collected information that enabled us to distinguish students who quit school totally prior to graduation from students who left school but subsequently transferred to a private school or a school in another district.

We found no consistent change in dropout rates across the two districts. As shown in figure 3.1, the dropout rate for educationally at-risk students across the high school years worsened by 3 percent for the postreform group in District A. It improved by 1 percent in District D.

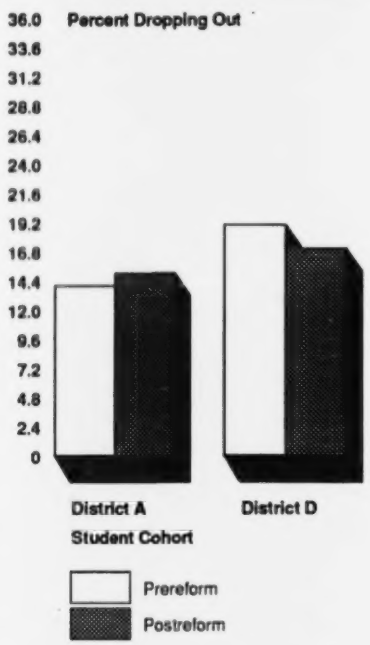
Figure 3.1: Dropout Rates for At-Risk Students in Districts A and D[a]



[a]Dropout rates were calculated over 3 years of high school in District A and 4 years in District D.

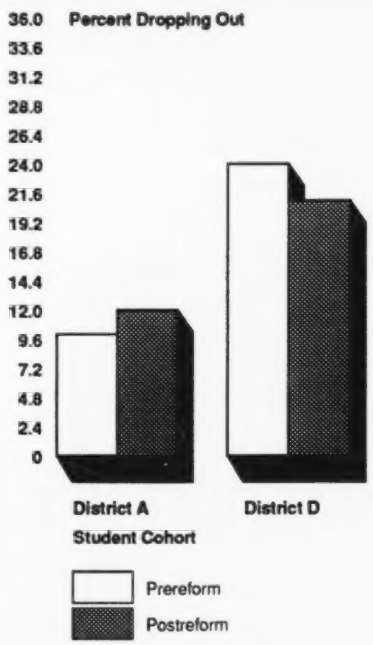
Generally, dropout rates increased in District A and declined in District D for other groups as well as for at-risk students. Although at-risk students were more likely to drop out than were their higher-achieving peers, as shown in figure 3.2, we found dropout rates for students not at risk shared the same general pattern shown by at-risk students. We also examined dropout rates for minority students. Again, we found the same overall pattern as shown in figures 3.3 and 3.4 on pages 43 and 44. There was one exception: the dropout rate for Hispanic students in District A was the same for both cohorts.

Figure 3.2: Dropout Rates for Students Not at Risk in Districts A and D[a]



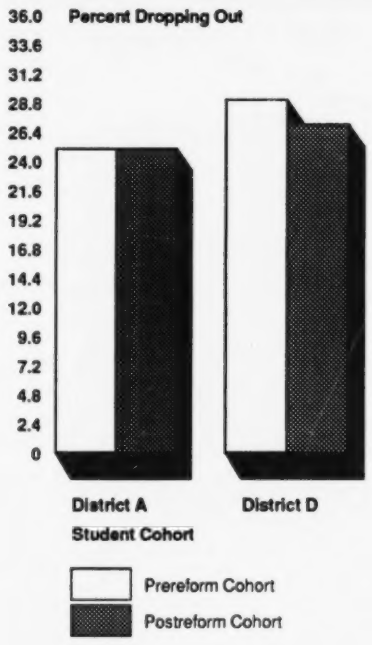
[a]Dropout rates were calculated over 3 years of high school in District A and 4 years in District D.

Figure 3.3: Dropout Rates for Black Students in Districts A and D[a]



[a]Dropout rates were calculated over 3 years of high school in District A and 4 years in District D

Figure 3.4: Dropout Rates for Hispanic Students in Districts A and D[a]



[a]Dropout rates were calculated over 3 years of high school in District A and 4 years in District D.

Conclusions

The educators we spoke with in the two districts had many views about the dropout problem, but we found no consensus that could explain the small fluctuations we found in the data. Furthermore, we found no general agreement among school officials as to whether dropout rates, as we defined them, were declining or increasing. In both districts, some educators thought that dropout-prevention programs and other types of extra help were lowering dropout rates, while others thought that higher standards were pushing disadvantaged students out of school.

The Effect of Educational Reform on Enrollment in Vocational Education

The last question we examined was whether educational reforms affected educationally disadvantaged students' enrollment in vocational education courses. The effect on students' enrollment might be expected to come through their schedules: more time spent on new academic courses or in remedial work to pass competency tests might have reduced opportunities to enroll in elective vocational education courses. Low-achieving students in general might have had more trouble meeting increased academic requirements and could have been more likely to participate in required remedial instruction and to repeat required courses. Therefore, reforms could reduce enrollments in vocational courses, especially among disadvantaged students. Thus, the questions we needed to answer were, first, what the effect of reforms has been on vocational education enrollments by at-risk students and, second, whether there have been differential effects on at-risk students in comparison to effects experienced by other students.

To answer the first question, we examined the prereform and postreform educationally disadvantaged students in terms of enrollment in academic and vocational courses, based on information from the two districts, A and B, that could provide the necessary enrollment data. We also compared the two groups of disadvantaged students in the type of vocational education taken and in the degree of concentrated study in vocational education.

Although aggregated enrollment data were available from state agencies in the four district's states, these data were inadequate to address our concerns about the effects of education reform on the enrollment patterns of at-risk students. The specific limitations of these data were that they

- included all school districts, thus mingling a wide range of variation in schedule and vigor of reform;
- were affected by changes in the size of overall student enrollment, which would affect enrollment in all course areas;
- might reflect variation in practices used by school districts to classify courses;
- included students who had to meet the new requirements and students who were under the older requirements for the period of our study; and
- did not distinguish disadvantaged from nondisadvantaged students.

Effects on At-Risk Students

Table 4.1 shows that educationally at-risk, postreform students enrolled in more academic courses and fewer vocational education courses than did at-risk prereform students. In both districts A and B, the average disadvantaged student enrolled in slightly fewer vocational education classes—about half a course less—than his or her predecessor. Academic enrollment increased, with the average postreform at-risk student taking 1.7 more academic courses in District A and 0.5 more in District B.[1] The increase in the number of class periods in District A apparently allowed the total number of academic courses to increase without an equivalent drop in vocational education enrollment. In District B, the drop in vocational education classes was actually greater than the increase in academic classes.

Table 4.1: Average Number of Courses and Change in Number of Courses for At-Risk Students Grades 9 Through 11

	District A			District B		
Subject area	**Prereform**	**Postreform**	**Change**	**Prereform**	**Postreform**	**Change**
Vocational	4.6	4.1	−0.5	4.1	3.4	−0.7
Consumer, homemaking	0.9	1.2	0.3	0.6	0.6	0
Labor market						
General	1.3	0.8	−0.5	0.9	0.9	0
Specific	2.4	2.1	−0.3	2.6	1.9	−0.7
Academic	23.9	25.6	1.7	14.5	15.0	0.5
Other	5.3	5.5	0.2	6.2	6.1	−0.1
Total	**33.8**	**35.2**	**1.4**	**24.8**	**24.5**	**−0.3**

The declines in vocational education enrollment were in labor market preparation courses rather than consumer and homemaking courses. Table 4.1 shows that the average number of labor market preparation courses (combining general labor market and specific labor market courses) taken by at-risk students declined by more than half a course, whereas the average number of consumer and homemaking vocational

[1]The number of courses taken in districts A and B are not directly comparable. District A offered many more one-semester academic courses than District B, which enabled students in District A to enroll in more academic courses. This has minimum effect on the results we report in this chapter, because our statistics report changes between cohorts within the same district.

education courses taken did not decrease.[2] Declines in labor-market-preparation course enrollment raise concerns that the educational reforms might be indirectly reducing the occupational preparation of disadvantaged students.

We found a decline in the proportion of at-risk students taking concentrated vocational education programs, defined as enrollment in five or more vocational education courses over 3 years of high school. In District A, the percentage of disadvantaged students enrolling in five or more vocational education courses over 3 years of high school decreased by approximately 8 percent. In District B, the percentage of disadvantaged students taking five or more vocational education courses decreased by about 16 percent. The additional period of instruction in District A might explain the more moderate effect in that district.

Effect on Students Not at Risk

Did the disadvantaged group experience special pressures, because of remedial classes or the need to repeat required courses, that might have caused a larger drop in total vocational enrollments? Our data from two districts demonstrated the same general pattern for disadvantaged students as for nondisadvantaged students: more academic and fewer vocational education courses.[3] For both groups, increases in academic courses mostly accrued from added English and mathematics courses, whereas declines in vocational education mostly involved decreases in labor market preparation courses. (The average number of courses and change in number of courses for students not at risk are shown in table 4.2.)

[2]We used the Secondary School Course Taxonomy, which was developed for the National Assessment of Vocational Education, to identify and classify academic and vocational education courses consistently across both districts. The classification system divides a high school curriculum into three major areas: academic (for example, English, mathematics, and fine arts), personal (health and physical education), and vocational education. Vocational education is broken down further into three divisions. One division, consumer and homemaking education, includes courses that prepare students for roles outside the paid labor markets, such as consumer economics and family life. A second division, general labor market preparation, consists of courses that teach skills that are related to employment such as beginning typing, career exploration, and industrial arts. A final division, specific labor market preparation, is composed of courses that teach skills that are related to specific occupational areas, such as agriculture, business, and communications.

[3]This finding is consistent with the results of other studies such as those conducted by Policy Analysis for California Education and the Center for Policy Research in Education. The former study tracked change in course enrollment in California after academic courses had been increased over a 5-year period. (The other study is discussed in appendix IV.) Although vocational education sustained an overall enrollment decline of 16.79 percent, evidence from the final year demonstrated an increase of 8.34 percent, suggesting that the bottom of the decline may have been reached. Whether the decreases in vocational education courses taken in the districts we studied are the beginning of a long-term decline in vocational education enrollment or are likely to be reversed in a few years is a question that remains to be answered.

Table 4.2: Average Number of Courses and Change in Number of Courses for Students Not at Risk Grades 9 Through 11

	District A			District B		
Subject area	**Prereform**	**Postreform**	**Change**	**Prereform**	**Postreform**	**Change**
Vocational	4.7	4.3	−0.4	3.5	3.3	−0.2
Consumer, homemaking	0.5	0.7	0.2	0.4	0.4	0
Labor market						
General	1.8	1.3	−0.5	0.9	1.0	0.1
Specific	2.4	2.3	−0.1	2.2	1.9	−0.3
Academic	26.8	29.1	2.3	14.4	14.8	0.4
Other	3.7	4.0	0.3	6.2	6.2	0
Total	**35.2**	**37.4**	**2.2**	**24.1**	**24.3**	**0.2**

Changes in the types of vocational education courses taken by nondisadvantaged students generally paralleled those of the disadvantaged group in both districts. The number of labor market preparation courses (general and specific) taken by the average student not at risk declined, by 0.6 of a course in District A and, to a lesser extent—about 0.2 of a course—in District B, while the number of consumer and homemaking education courses taken did not decline.

The proportion of students not at risk taking five or more vocational education courses declined as for at-risk students. The extent of this change, however, was less dramatic for students not at risk than for the at-risk students, particularly in District B. In District A, the proportion of students enrolled in five or more vocational education courses decreased by 4 percent for students not at risk but by about 7 percent for disadvantaged students. In District B, the proportion of students not at risk enrolled in five or more courses decreased by 3 percent but by about 16 percent for disadvantaged students. The explanation for the District B findings may be in the fact that the average number of total courses taken increased slightly for students not at risk but declined for at-risk students in District B.

Discussion

We found that declines in vocational education enrollment were associated with increased academic enrollment in both districts, but the magnitude and ratio of trade-off differed. For the disadvantaged group in District A, the trade-off was a mean loss of half a vocational education course per student compared to an increase of 1.7 academic courses per student. In District B, the trade-off was more severe: a loss of 0.7 of a

vocational education course for 0.5 of an academic course for the disadvantaged group, or a ratio of about two vocational education courses for one academic course.

Reforms affecting students in District A included requirements that increased the number of English and mathematics credits needed for graduation. The two additional academic courses taken by postreform students corresponded to these requirements. Thus, enrollment in academic courses could increase without a corresponding decline in vocational education courses, because the district added one class period per day after reforms were implemented.

In District B, reforms affecting high school students included passing a competency test as a graduation requirement and mandatory remediation for students scoring below state standards on this test. A substantial increase in academic courses was not seen in this district, possibly because additional academic courses were not required for graduation. For disadvantaged students, the small increase in academic requirements that we found might have been associated with mandatory remediation, because low-achieving students would be most likely to perform poorly on tests and, thus, have to take supplemental remedial courses. However, District B provided remediation to low-achieving students before the requirements for competency testing were implemented. In addition, since the increase in academics was shared by the average student not at risk who was not likely to enroll in remedial courses, the increase probably reflected factors other than specific high school reforms, such as changes in student or parent preference, school guidance, course availability, or state college requirements.

Our data from District A, where increased academic courses were required for graduation, suggest that these increases may have affected the ability of students to engage in concentrated vocational education programs of five or more vocational education courses over 3 years of high school. Proportionally fewer postreform students enrolled in five or more vocational education courses. Although these requirements may not have prevented students from enrolling in some vocational education, they might have had a disparate effect on the subgroup of students who chose to enroll in concentrated vocational education programs.

In both districts, we found that students were taking fewer courses that taught specific occupational skills. Because most of these courses were sequential and were often scheduled for longer blocks of time than other

courses, it might have been more difficult for students to find time to schedule these courses and also meet additional academic requirements.

The small decreases in the average number of vocational education courses taken by all students translated into relatively substantial decreases in total vocational education enrollment. In District A, student enrollment in vocational education classes declined 7 percent, or about 2,264 student classes. In District B, overall enrollment in vocational education courses declined 11 percent, or about 610 student classes. Decline of these magnitudes may somewhat affect the availability of some vocational education courses and the number of vocational education teachers employed.

Design and Measurement Issues

The Cohort Design

The effects of reform, if any, would be reflected in the difference between the actions of students—their achievement performance, dropout behavior, and enrollment patterns—under reform requirements and what their actions would have been in the absence of reform. We were able to directly measure how the postreform group acted under reform requirements, but we had to estimate what they would have done in the absence of reform. In our cohort design, we used the achievement scores of the prereform cohort as our estimate of what the postreform group would have done in the absence of reform. We estimated the effects of reform as the difference in actions between the prereform cohort and the postreform cohort.

Any research design tries, with varying degrees of certainty, to control factors that may jeopardize the validity of findings. Our main concern was with issues of internal validity. That is, Did our inquiry sufficiently control for factors other than reform that could explain our findings? In this section, we review notable factors that might have jeopardized our ability to discern the effects of reform and discuss how our design and analysis served to control them.

We would have liked to have stressed external validity (the ability to generalize from our findings to school districts other than the ones that we studied) as well, but we could not do both in this study. Given our resources, our choice of large school districts to allow oversampling of at-risk students could not be reconciled with a choice of districts with student populations that would have been nationally representative.

Experience During the Years Studied

If the cohorts experienced different historical events during high school besides reform efforts, then differences in achievement, dropout rates, or course enrollment might have been caused by these other events rather than by reform. One of the strengths of our cohort design is that the adjacent cohorts going through high school shared an overlapping history. Having entered high school only 1 year apart (2 years apart in District A because of a reform transition year), the two cohorts' largely overlapping histories made it less likely that events other than reform, such as changes in job opportunities for dropouts, might have explained differences in their actions.

However, since reform history also overlapped the experiences of both cohorts, reform might have indirectly affected the actions of the prereform cohort. If this occurred—for example, if reform induced changes in course offerings, the enrollment patterns of the prereform cohort might

have been affected also—then we would underestimate the effects of reform. We knew, however, that the direct effects of additional graduation requirements mandated by reform did not apply to the prereform cohort.[1]

Initial Cohort Differences

If the two student groups differed in ways significant to outcomes, such as higher median achievement among at-risk students in one or the other cohort, later differences might have resulted from these initial differences rather than from reform. A truly experimental approach to controlling initial differences would have been to randomly assign students to reform and not-reform experiences, but this option was obviously not possible for after-the-fact studies such as ours.

Cohort Differences Over Time

Even if the compared cohorts did not have initial differences in the eighth grade, differential losses of students from the two cohorts during high school might also confound our findings about the effect of reform on student achievement. For example, if poorer-achieving students were more likely to drop out of the postreform group, then this group's superior performance in the high school test might have resulted from having a larger percentage of better students remaining in school rather than from students' learning better.

In our analyses of achievement and enrollment, we limited our analyses to "survivors" to avoid confounding our results with differential loss of students. We analyzed only the students for whom the school had the necessary data on achievement and enrollment over the years we examined. (Note that the necessary data might not be available for a number of reasons, including withdrawal from school, not taking a test for whatever reason, or failure of the district to enter data.) While survivor analysis limited our findings to students for whom data were available, it ensured that within-cohort changes in median achievement were not caused by differences in attrition rates. Also, survivor analysis allowed us to examine the differences in average course enrollment over the same number of years, because students who did not attend school for the entire period we studied, and who consequently enrolled in fewer

[1]Some prereform students might have been directly affected if they were required to meet reform requirements because they failed to progress normally after entering the ninth grade (their first year of high school), thus graduating after reforms were implemented. As noted in chapter 1, these mixed-treatment cases did not significantly affect our analysis, because in two districts they were a small percentage (less than 10 percent) in our achievement analysis, and, in the two other districts, prereform students who were retained were allowed to graduate under the older requirements.

courses, were excluded from our analyses. However, the use of survivor analysis obscured differential losses of nonsurvivors between educationally at-risk students and students who were not at risk.

In the case of our achievement analyses, our data on eighth-grade scores suggested that the combined factors of initial differences in achievement and subsequent differences in student loss were not important problems. In three of our districts, the analyzed prereform and postreform groups had quite similar eighth-grade scores. (Note in figure 2.1 that the initial median scores between the groups tended to be close or identical.) In the remaining district, differences in eighth-grade scores were exacerbated by the transitional year that separated the cohorts in only this district. Furthermore, our use of gain-score analysis, which compared changes in scores between eighth grade and high school rather than differences in high school scores, served to adjust for initial differences. (This adjustment, however, could not resolve any bias arising from anything other than the reform, which might have produced greater change in the median scores in one cohort than another.)

Regression Toward the Mean

If groups are selected on the basis of extreme scores, there is a tendency for a group's score to move closer to the mean of the overall group upon retesting. As a result of this statistical tendency, called "regression toward the mean," the test scores of a group selected as low achievers would be expected to improve upon retesting, even if reform had no effect at all. We have avoided confounding regression toward the mean with the effect of reform by comparing the differential gains between two identically defined extreme groups, the prereform and postreform groups of at-risk students. Because we used the same criterion to define at-risk groups in the prereform and postreform cohorts, we have no reason to believe that this statistical tendency influenced scores of the at-risk groups differentially. We have cautioned against making comparisons between the postreform groups of students at risk and students not at risk, because regression toward the mean is likely to result in observed improvements among at-risk students but not among postreform students not at risk, independently of the effects of reform.

Measurement Issues

Achievement Data

We used scores on norm-referenced achievement tests to measure achievement, because they provided a standard and reliable measure to compare the differences between eighth-grade scores and high school scores for students in the prereform and postreform cohorts. Although course grades were available in some districts, we thought that course grades were too subjective to allow meaningful comparisons. We also rejected the use of Scholastic Aptitude Test (SAT) and American College Testing (ACT) Program examination scores. Since the SAT and ACT are usually taken only by college-bound students, scores on these tests would not be available for large numbers of at-risk students, who were the focus of our study. Furthermore, scores on these tests are unsuitable for measuring relative gains over time, since they are taken only toward the end of students' high school careers, and no comparable test is given earlier.

When a school district changes from an earlier to a more recent edition of an achievement test, average scores might appear to increase or decrease substantially as a result of changes in the norm group or test item from one edition to the other. This phenomenon did not affect our analyses. In two of the districts, both cohorts were tested on two occasions with the same edition of the test. In the two other districts, new editions of the test were introduced during the years we examined. However, we were able to use scores that had been equated from the newer edition to the older edition, so that the scores we compared were equivalent.

We analyzed changes in achievement by comparing the differences between the median percentile scores obtained by prereform and postreform group on eighth-grade tests with those obtained on tests taken during the third year of high school.[2] We used percentile scores because percentiles were the only common measure available across all four districts. Because percentiles are unequal units that do not conform to a normal curve, analyses comparing differences in outcome for the median subject were most suitable for our data.

[2]In District C, high school achievement tests were routinely administered to only 10th-grade students. Therefore, we used 10th-grade scores for our posttest comparison.

We were unable to control for district or school practices that might have excluded certain students from testing. While information from one district indicated that students in regular high school placements who were handicapped or suspected of being handicapped might have been excluded from testing, information from the districts did not suggest that large groups of students were exempt from testing. Local officials indicated that district testing practices did not change when reforms were introduced. If district or school practices might have excluded some students from testing, we have no reason to believe these practices had differential effects on outcomes for the prereform and postreform cohorts.

Dropout Rates

Two districts were able to supply attendance data that included reasons for withdrawal from school. We computed dropout rates by tracking all ninth-grade students in the prereform and postreform groups in these districts over their high school years. We tracked students in District A through the beginning of their third year of high school and students in District D through the beginning of their fourth year of high school. We defined dropouts as students who left school without graduating or transferring to a private or out-of-district school.[3] This method allowed us to control for the effects of residential migration into and out of a district.

We chose to compute dropout rates rather than use rates provided by the districts because of the limitations these data presented. In one district, for example, dropout rates were computed while ignoring withdrawal codes that indicated students enrolled in schools elsewhere. In two districts, dropout data were computed for the school year and did not include students who dropped out during the summer. In addition, district data did not control for the effects of students moving into the district, nor did they allow us to distinguish differences between rates for at-risk students and students not at risk or to track the rates for prereform and postreform cohorts.

Despite the obvious strengths of our method, our data also presented some limitations. First, we were unable to verify the withdrawal codes provided by the districts and, therefore, we were unable to know if

[3]Students who indicated that they planned to enter a general equivalency diploma (GED) program were counted as dropouts.

codes were used reliably or consistently from one year to another. Second, we were unable to identify students who dropped out but who subsequently reenrolled in school. A third limitation was that students who dropped out of school before entering the ninth grade were not included in our analyses. Although this was not technically a limitation, because our study focused on the effects of reform on high school students, the omission of seventh- and eighth-grade dropouts reduces the comparability of our results with those of studies that included these students. Finally, our data did not record dropping-out behavior over the total time students were in high school.

Appendix II

Median Achievement Scores and Net Gain

In this appendix, we present the data for chapter 2. The table numbers correspond to figure numbers in chapter 2.

Table II.1: At-Risk Students

Cohort	Median percentile score		Net gain[a]
	Grade 8	High school	
Mathematics			
District A			
Prereform	10	21	
Postreform	20	27	−4
District B			
Prereform	35	31	
Postreform	35	39	8
District C			
Prereform	27	24	
Postreform	27	31	7
District D			
Prereform	32	34	
Postreform	33	34	−1
Reading			
District A			
Prereform	8	20	
Postreform	13	22	−3
District B			
Prereform	23	17	
Postreform	22	15	−1
District C			
Prereform	21	16	
Postreform	20.5	20.5	5
District D			
Prereform	15	19	
Postreform	17	18	−3

[a]Net gain was computed by subtracting the change in scores for the prereform cohort from the change in scores for the postreform cohort.

Table II.2: Black Students

Cohort	Median percentile score		Net gain[a]
	Grade 8	High school	
Mathematics			
District A			
Prereform	13	27	
Postreform	31	33	−12
District B			
Prereform	48	41	
Postreform	47	47	7
District C			
Prereform	35	33	
Postreform	35	41	8
District D			
Prereform	36	36	
Postreform	40	39	−1
Reading			
District A			
Prereform	15	25	
Postreform	23	29	−4
District B			
Prereform	36	27	
Postreform	36	26	−1
District C			
Prereform	32	24	
Postreform	31	33	10
District D			
Prereform	25	23	
Postreform	29	24	−3

[a]Net gain was computed by subtracting the change in scores for the prereform cohort from the change in scores for the postreform cohort.

Table II.3: Hispanic Students

Cohort	Median percentile score		Net gain[a]
	Grade 8	High school	
Mathematics			
District A			
Prereform	21	33	
Postreform	41	43	−10
District B			
Prereform	46	42	
Postreform	51	47	0
District C			
Prereform	[b]	[b]	
Postreform	[b]	[b]	[b]
District D			
Prereform	63	59	
Postreform	60	56	0
Reading			
District A			
Prereform	20	28	
Postreform	32	38	−2
District B			
Prereform	35	26	
Postreform	39	25	−5
District C			
Prereform	[b]	[b]	
Postreform	[b]	[b]	[b]
District D			
Prereform	46	43	
Postreform	46	41	−2

[a]Net gain was computed by subtracting the change in scores for the prereform cohort from the change in scores for the postreform cohort.

[b]Not applicable.

Table II.4: Students Not at Risk

Cohort	Median percentile score		Net gain[a]
	Grade 8	High school	
Mathematics			
District A			
Prereform	63	59	
Postreform	64	61	1
District B			
Prereform	61	55	
Postreform	63	55	−2
District C			
Prereform	57	61	
Postreform	61	70	5
District D			
Prereform	76	73	
Postreform	76	73	0
Reading			
District A			
Prereform	60	65	
Postreform	58	62	−1
District B			
Prereform	51	42	
Postreform	53	41	−3
District C			
Prereform	64	58	
Postreform	64	68	10
District D			
Prereform	68	62	
Postreform	69	60	−3

[a]Net gain was computed by subtracting the change in scores for the prereform cohort from the change in scores for the postreform cohort.

The Effects of Reform in Rural School Districts

Educational reforms might have had different effects in rural than in urban districts.[1] Difficulties in implementing reforms and disruptions associated with reforms might have been greater in rural areas than in urban areas because rural districts have fewer resources. Also, reforms in rural areas might have done less to improve achievement or dropout rates of disadvantaged students, because resources needed to provide appropriate interventions for disadvantaged students might have been less available. Although a great deal of divergence exists among rural areas, rural areas generally have lower tax bases, because they have relatively fewer inhabitants, and a disproportionate number of rural inhabitants are poor. Schools in rural areas tend to be smaller and provide fewer course offerings. In addition, rural districts often have greater difficulty in recruiting and retaining teachers.

Additional graduation requirements and compulsory remedial courses might have had a greater effect on vocational education enrollment in rural schools than in nonrural schools. The need to direct additional students, teachers, and funds to academic areas might divert resources from vocational areas. This redirection might have had serious consequences on the availability of vocational courses and on the ability of students to enroll in vocational courses, because rural schools tend to lack sufficient students to support diverse program offerings. Thus, personnel and economic constraints might be expected to impose additional limitations on the ability of schools to provide diversified vocational education program offerings.

In order to investigate the effect of educational reforms in rural areas, we conducted an opinion survey with approximately 20 rural school officials and researchers with direct knowledge of the effects of educational reforms in rural areas. Among the individuals we surveyed, we included officials from two school districts, one from a high-poverty area and one from a low-poverty area, in the four states where we studied the effects of reforms in urban districts.

This approach allowed us to collect information from a sizable number of informants with knowledge of the effects of reform on diverse rural districts, so that we might compare the effects of reform in rural and urban districts. Since the survey was not based on a random sample, we cannot generalize our findings to other rural districts. We did not

[1]We were unable to include rural districts in our study. Our analyses required that we select districts that served large numbers of disadvantaged students and maintained historic student data on computer tapes. We were unable to locate rural districts that satisfied both these criteria.

attempt to validate the data or observations underlying the opinions we solicited.

Implementation of Educational Reforms

We found the resources to implement reforms varied widely among rural districts, including rural districts in the same state. Several respondents indicated that rural districts were forerunners in implementing reforms. These districts had the resources to implement reforms that met or exceeded state reforms that were passed later. However, other respondents indicated that the implementation of reforms was burdensome and stretched the financial and administrative capacities of rural schools. For example, a rural school official mentioned that guidance counselors in his district were functioning as record keepers rather than counselors. The tracking requirements imposed by reforms were so cumbersome that counselors no longer had time to provide counseling services to students.

Effects of Reform on Achievement and Dropout Rates

Educational reforms appeared to have both positive and negative effects on educational outcomes for educationally at-risk students. Rural officials, like their urban counterparts in the districts we visited, reported that many educationally disadvantaged students were experiencing gains in achievement because of the availability of remedial instruction and other special programs targeted toward the disadvantaged that were funded as part of educational reform in many states. In addition, respondents indicated that new state mandates were useful in leveraging additional funds to support district-level programs from local school boards.

According to some respondents, student frustration increased as a result of increased academic course requirements. Students who had failed any courses (particularly those who attended schools offering fewer than seven periods) experienced much difficulty in scheduling the expanded requirements. We were told that many of these students elected to drop out rather than remain in school an additional year.

"No pass, no play" rules that prevented students who failed one or more courses from participating in extracurricular activities might have had a greater effect on student frustration in rural areas than in nonrural areas. Perhaps because of the importance of extracurricular activities to the social lives of rural students, respondents associated banning students from these activities with increased frustration and increased dropout rates.

While most respondents reported increased student frustration and higher dropout rates during the early years of reform, others indicated that dropout rates were stable or declining. In districts where declining dropout rates were reported, improvements were attributed to postreform dropout prevention programs and remedial supports.

Effects of Reform on Vocational Education Enrollment

Slightly more than half the respondents indicated that vocational education enrollment was declining in rural districts. As in the urban districts we visited, decline was associated with increased academic graduation requirements, mandated remedial instruction, and the redirection of resources from vocational areas to academic areas. Respondents told us that additional required courses might have reduced the number of vocational education courses under some conditions. Mandates that increased the number of academic or remedial courses that students must take tended to decrease the number of elective courses, including vocational education. In contrast, some districts added an extra period that allowed students to take more academic courses without a corresponding decrease in vocational education courses. Other districts historically offered relatively long eight-period instructional days, which made it possible for students to meet new requirements and still have opportunities to enroll in vocational education courses.

Several respondents indicated that rural districts had difficulties recruiting mathematics and science teachers, and these difficulties were exacerbated when reforms increased the demand for teachers certified in this area. Many districts granted emergency certifications to vocational education teachers and teachers of other elective subjects to fill newly created academic positions. In these districts, fewer teachers were assigned to vocational education courses after reform, which might have limited the availability of vocational courses.

The lack of adequate physical facilities and classroom space also appeared to limit the availability of vocational education courses. Some respondents said that reforms that required reductions in class size and supplemental remedial classes taxed the physical capacity of some rural schools and made it necessary to reassign vocational education classrooms to academic classrooms.

Conclusion

Reforms reportedly have had divergent effects on schools in rural areas. We were told that the academic level and graduation rates of disadvantaged students improved when resources were adequate and remedial

and other student supports were in place. We were also told that when the school day was sufficiently long and vocational education course offerings were readily available, vocational education enrollment did not decline. However, reforms appeared to be placing a disproportionate burden on the administrative capacities of rural schools and on the ability of rural schools to provide diverse course offerings.

Related Multistate Studies

This is the first multistate study to assess the effects of reform on the achievement, dropout rates, and course enrollments of disadvantaged high school students. We searched for related multistate studies, using both computer data base searches and phone interviews with experts in the field. With regard to academic achievement, we were unable to identify any other multistate study that assessed the effects of educational reforms upon the achievement of high school students. However, a multistate study examined the effects of reform on dropout rates. Another multistate study explored the relationship of reforms to course offerings available to high school students while another study compared student course enrollment patterns over a time span during which many states implemented reforms. We cite these four studies and summarize their findings below.

Effects of Reforms on Dropout Rates

Amelia E. Kreitzer, George Madaus, and Walt Haney explored the relationship between state minimal competency testing requirements and dropout rates in the 10 states with the highest and lowest dropout rates in 1986.[1] Of the 10 states with the lowest dropout rates, five had no competency testing requirements and none had requirements that students must pass an exit test to graduate. Of the 10 states with the highest dropout rates, all had competency testing requirements and nine of the 10 used tests to determine eligibility for high school graduation. In explaining this apparent link between dropping out and minimal competency tests, these authors concluded that although state minimal competency requirements might have increased the dropout rates for students at risk of dropping out in situations where graduation and promotional decisions were based on results from these tests, it is more likely that high dropout rates were among the conditions that motivated state legislatures to mandate minimal competency test requirements in the first place. Although this study did not establish a causal relationship between minimal competency testing and dropout rates, it raised important questions regarding the relationship between reforms that increased academic requirements and changes in dropout rates.

Enrollment Patterns

The Center for Policy Research in Education examined the effects of increased high school graduation requirements on course offerings in

[1] Amelia E. Kreitzer, George F. Madaus, and Walt Haney, "Competency Testing and Dropouts," forthcoming. The authors used state-level data from the U.S. Department of Education. The limitations of using aggregated data were noted earlier in this report.

four states where graduation requirements had been increased.[2] Using data provided by a nonrandom sample of 19 high schools in 13 districts, the center found that the most common changes in course offerings were additions of mathematics and science courses: 12 of the 13 districts reported adding sections in these areas.[3] The sections added were predominantly at the basic level. Of the 17 schools adding mathematics sections, 15 reported adding basic, general, and remedial sections. Of the 16 adding science sections, 14 reported adding basic, remedial, or general-level course offerings. Reductions were reported in elective courses such as vocational education, physical education, and performing arts and were attributed to the new graduation requirements. Because of differences in methodology and data, we were unable to directly compare these results with our findings. However, these results were consistent with our finding that students in districts where graduation requirements increased were taking more academic courses and fewer vocational courses.

The National Assessment of Vocational Education compared changes in course enrollments between 1982 and 1987.[4] From data from student transcripts, it was found that graduates of the high school class of 1987 took an average of nearly two more credits than the graduates of the high school class of 1982. (A credit was defined as a typical course that meets five periods per week.) It was also found that students who graduated in 1987 enrolled in slightly less vocational education than students who graduated in 1982. Vocational education enrollment declined slightly from an average of 4.38 credits in 1982 to 4.24 credits in 1987. The authors suggested that declines in vocational education enrollment might be larger in future years as more states implement reforms that increase academic graduation requirements.

Findings from another study suggested that increased graduation requirements were restricting vocational education enrollment in some

[2]William Clune, Paula White, and Janice Patterson, The Implementation and Effects of High School Graduation Requirements: First Steps Toward Curricular Reform (New Brunswick, New Jersey: Center for Policy Research in Education, 1989).

[3]The data were collected during interviews during the spring of 1987. In three states, increases in requirements were implemented in that year. In the fourth state, reforms were not scheduled to be implemented until 2 years later. However, school officials reported that the necessary courses had been put in place so that students could meet the new requirements before their senior year.

[4]National Assessment of Vocational Education, testimony of John G. Wirt before the Subcommittee on Elementary, Secondary, and Vocational Education, Committee on Education and Labor, U.S. House of Representatives, March 7, 1989. Although many state reforms were implemented between 1982 and 1987, the national random sample included data from states that did not pass reforms that increased graduation requirements as well as from states that had not yet implemented new requirements.

states. Using aggregated enrollment data obtained from questionaires sent to state directors of vocational education, Nevin R. Frantz, Deborah C. Strickland, and Donald E. Elson found that vocational enrollments in over half the states had either declined at a faster rate than overall high school enrollment or had increased at a slower rate than the number of high school students between the 1982-83 and 1986-87 school year.[5] These authors concluded that state-level actions, such as requiring a vocational education course or providing funding incentives for vocational education, appeared effective in preserving vocational education programs.

[5]Nevin R. Frantz, Jr., Deborah C. Strictland, and Donald E. Elson, "Is Secondary Education at Risk?" Vocational Education Journal, October 1988, pp. 34-37.

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